2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833
Tel (916) 920-0300
Fax (916) 920-8463

April 30, 2004
SAC-314497-043004-DD

Mr. Robert Worl
Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

**Subject: Applicant's Responses to CEC Staff Data Requests 1-57
Los Esteros Critical Energy Facility, Phase 1 Relicense and Phase 2 Combined-Cycle Conversion (03-AFC-02)**

Dear Mr. Worl:

Attached are an original and 12 copies of Los Esteros Critical Energy Facility, LLC's responses to the California Energy Commission Staff's Data Requests (1-57) for the Application for Certification for the Los Esteros Critical Energy Facility, Phase 1 Relicense and Phase 2 Combined-Cycle Conversion (03-AFC-02).

If you have any questions about this matter, please contact me at (916) 286-0278.

Sincerely,

Douglas M. Davy, Ph.D.
AFC Project Manager

Attachment

cc: R. Tetzloff
S. DeYoung
G. Wheatland

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION FOR THE LOS ESTEROS CRITICAL ENERGY FACILITY PHASE 2 (LOS ESTEROS 2)	**DOCKET NO. 03-AFC-2** **(Revised April 27, 2004)** ***PROOF OF SERVICE***

I, Anar Bhimani, declare that on April 30, 2004 I deposited copies of the attached Response to Data Requests 1-57 in the United States mail at Sacramento, CA with first class postage thereon fully prepaid and addressed to the following:

DOCKET UNIT

Send the original signed document plus the required 12 copies to the address below:

CEC DOCKET UNIT
Attn: Docket No. 03-AFC-2
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

In addition to the documents sent to the Commission Docket Unit, also send individual copies of any documents to:

APPLICANT

***Calpine**
Rick Tetzloff, Project Manager
805 SW Broadway, #1850
Portland, OR 97205

***Steve De Young**
Environmental Manager
4155 Arbolado Drive
Walnut Creek, CA 94598

COUNSEL FOR APPLICANT

Ellison, Schneider & Harris LLP
Greg Wheatland
Jeff Harris
2015 H Street
Sacramento, CA 95814
glw@eslawfirm.com
jdh@eslawfirm.com

INTERESTED AGENCIES

***San Jose Dept. of City Planning and Building Code Enforcement**
Richard Buikema, Sr. Planner II
801 N. First Street, Room 400
San Jose, CA 95110

County of Santa Clara Planning Office
Michael Lopez
County Government Center
70 West Hedding Street
East Wing, 7th Floor
San Jose, CA 95110-1705

California Air Resources Board (CARB)
Michael Tollstrup
Project Assessment Branch
P.O. Box 2815
Sacramento, CA 95812
mtollstr@arb.ca.gov

Santa Clara Valley Water District
Luis Jaimes
5750 Almaden Expressway
San Jose, CA 95118-3686
ljaimes@scvwd.dst.ca.us

William DeBoisblanc, Director Permit Services
Bay Area Air Quality Mgmt. District
939 Ellis Street
San Francisco, CA 94109

Regional Water Quality Control Board (RWQCB)
Judy Huang
1515 Clay Street, Suite 1400
Oakland, CA 94612
jch@rb2.swrcb.ca.gov

City of San Jose
Environmental Services Department
Municipal Water System Division
3025 Tuers Road
San Jose, CA 95121

Robert C. Wilson, P.E.
California Department of Water Resources
1416 9th Street, Room 1104-1
Sacramento, CA 95814

INTERESTED PARTICIPANTS

Cal-Independent System Operator
Jeff Miller
151 Blue Ravine Road
Folsom, CA 95630
jmiller@caiso.com

Electricity Oversight Board
770 L St., Suite 1250
Sacramento, CA 95814

I declare that under penalty of perjury that the foregoing is true and correct.

Anar Bhimani

Response to

California Energy Commission Staff Data Requests 1-57

on the

Application for Certification

for the

Los Esteros Critical Energy Facility

Phase 1 Relicense and
Phase 2 Combined-Cycle Conversion
San Jose, California

03-AFC-02

Submitted to the
California Energy Commission

Submitted by
Los Esteros Critical Energy Facility, LLC

April 2004

Contents

Introduction

Attached are the responses of Los Esteros Critical Energy Facility (LECEF), LLC (Applicant) to California Energy Commission (CEC) Staff data requests for the Los Esteros Critical Energy Facility Phase 1 Relicense and Phase 2 Combined-Cycle Conversion (03-AFC-02). The CEC Staff served these data requests on April 7, 2004, as part of the discovery process for the LECEF project. Within each discipline area, the responses are presented in the same order as requested by the CEC Staff and are keyed to the CEC Staff Data Request number. New or revised graphics or tables are numbered in reference to the data request number. (For example, Figure DR15-1 would be the first figure submitted in response to Data Request 15.)

Additional tables, figures, or documents submitted in response to a data request (supporting data, plans, folding graphics, etc.) are found as attachments at the end of a discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

Technical Area: Air Quality (1-12)

AGC Agreement

1. *Will the Phase 1 Los Esteros Critical Energy Facility have an AGC agreement with the ISO?*

Response: It is not known at this time whether the Phase 1 Los Esteros Critical Energy Facility will have an AGC agreement with the ISO.

AGC and Emissions

2. *If such an agreement is planned, please provide an analysis of any impacts the AGC will have on the project's ability to comply with all proposed emissions limits.*

Response: The AGC is not expected to have any impacts on the project's ability to comply with all proposed emissions limits. The single exceedance at LMEC identified by Staff did not occur while the facility was operating under AGC. The exceedance occurred as the transition was being made from AGC to manual control and occurred at a time when AGC was first being implemented at Calpine. Since that time, there have been procedures implemented to prevent this situation from recurring. There have been no other exceedences at any of Calpine's plants in connection with the AGC.

Emissions Data

3. *Please provide emissions data and an analysis that substantiates the need for a 20% increased PM_{10} emissions limit for the facility.*

Response: The Applicant is proposing an increase in PM_{10} emission limits for the facility to address concerns regarding variability in source test methods. This variability is illustrated in the following summary of source test results from March 2003 at the LECEF (Table DR3-1). All turbines were operated under identical conditions on the same pipeline natural gas, and the individual test results varied from a low of 1.45 lb/hr to a high of 3.47 lb/hr. The mean value for these twelve tests was 2.50 lbs/hr; the standard deviation was 0.65 lbs/hr. The Applicant has also seen data for the same model turbines which reflect emissions as low as those reported by Staff. However, the Applicant is unable to select a permit limit that reflects the best results that have been achieved at a particular location in a single test series. Rather, the Applicant desires to select a limit that can be achieved on a consistent basis.

While the Applicant continues to work with source test professionals and engineering consultants to reduce the variability in the source test results (and has greatly succeeded in that effort to date), we are also proposing a higher emissions limit to reflect the reality of the test results and to ensure that the emissions limits are realistic limits that can be met on a continuous basis using currently available test methods.

Table DR3-1
Summary of Compliance Test Results, Los Esteros Critical Energy Facility, March 2003

	PM_{10}, lb/hr				
	Run 1	**Run 2**	**Run 3**	**Average**	**Limit**
Unit 1	3.47	2,46	1.45	2.46	2.5
Unit 2	1.92	3.22	2.75	2.63	2.5
Unit 3	2.96	1.80	2.74	2.50	2.5
Unit 4	2.91	1.46	2.88	2.42	2.5

PM_{10} Emissions

4. *Please provide a detailed record of efforts that have been made at the facility to control the PM_{10} emissions, in order to maintain compliance with the existing emissions limit.*

Response: As the Commission Staff is aware, it is not possible to directly control PM_{10} emissions from gas turbines. PM_{10} emissions are minimized through the use of best available control technology, which for PM_{10} is best combustion practices and the use of natural gas fuels. The Applicant performed a more detailed analysis of the source test results that are summarized in Response 3 above and concluded that the high measured PM_{10} concentrations are due to high levels of particulates captured in the probe wash when Method 5 is used for the front half, and high levels of particulates captured in the organic extract portion of Method 202, which is used for the back half, from as-yet undetermined sources. Method 5 is used for the front half (instead of EPA Method 201a) to avoid the potential for oxidation or other chemical conversion of sulfur in the probe assembly.[1] The Method 202 organic extract problem appears to be random yet systematic, i.e., for some test crews/test series, the problem appears in virtually all results, while the same crew can come back four weeks later and there will be no problem at all.

PM_{10} Mitigation

5. *If PM_{10} emissions limits were increased, then additional mitigation would likely be necessary. Please provide a plan for "scaling up" the existing PM_{10} Mitigation Plan, as defined in the existing LECEF1 condition AQ-SC4, to mitigate the proposed additional 9.3 tons/year of PM_{10}, if deemed necessary. Please include documentation of communication with any involved local agencies (e.g. BAAQMD or local school districts), indicating their preliminary interest in participating in the expanded plan.*

Response: In July 2002, LECEF gave the BAAQMD $510,500 to fund PM_{10} mitigation programs consisting of wood stove and fireplace replacements/retrofits and the subsidies for the purchase of low-emitting school buses. The PM_{10} mitigation plan submitted to the CEC on June 24, 2002, demonstrated that the expenditures for both programs were expected to mitigate 3,947,427 lb/yr of PM_{10} from LECEF. Since this quantity of mitigation far

[1] Method 201a was used to test PM_{10} at the Gilroy peaking turbines (also LM6000 units) in early 2002. Due to the high turbine exhaust temperatures, an inconel (high temperature steel alloy) cyclone and probe were used. While Method 201a is routinely used to test front half PM_{10} at other Calpine facilities, these other facilities have Frame CTGs that operate in combined cycle with much lower exhaust temperatures. As a result of these lower exhaust temperatures, the Frame units are tested using a stainless steel cyclone and a Teflon sample line to the impingers. We have identified two potential concerns. First, at the high temperatures we have with the peakers, the inconel may be acting as a catalyst, oxidizing more sulfur dioxide to sulfur trioxide (and hence to particulate sulfates) than would be the case with the cyclone and probe used with the Frame turbines. Second, the source test firm reported that the residue found in the impingers was green in color, suggesting that it may be a metallic oxide (perhaps from the sample probe) rather than a salt. Although inconel is supposed to be corrosion resistant (and well suited to this type of application), the introduction of this new material and probe assembly is a variable that can be controlled. By changing to Method 5 for the front half analysis, the cyclone is eliminated, and we use a high-temperature quartz glass probe that is inert.

exceeds both the original and the new proposed PM_{10} emissions from LECEF, additional mitigation is not necessary. Since the Applicant is not proposing to "scale up" the existing PM_{10} mitigation plan, local agencies were not contacted to solicit interest in an "expanded plan."

Sulfur Content

6. *The current LECEF1 Condition of Certification AQ-24(c) specifies a limit of 0.25 gr S/100 scf and Condition of Certification AQ-25(e) specifies that fuel sulfur testing must be performed quarterly. Section 8.1.2 of the AFC (pg. 8.1-10) proposes not only increasing the limit to 0.33 gr S/100 scf, but also annually averaging the fuel sulfur tests to determine compliance. As is acknowledged in footnote #6 on pg. 8.1-10, a longer averaging period is considered less stringent. Please justify the need for the longer (i.e. less stringent) averaging time period in addition to the increased fuel sulfur content limit.*

Response: The permit conditions related to fuel sulfur content cited above effectively require LECEF to meet a limit of 0.25 gr/100 scf for each fuel sample tested, even though testing is required only once per quarter. Without the ability to average the test results, even a slightly higher fuel sulfur content limit would still require the compliance of each sample with the limit. As fuel sulfur can vary from test to test, the Applicant requests the ability to average the test results to achieve compliance rather than being required to show compliance for each sample. This approach is identical to that approved by the BAAQMD and the CEC for the recently-licensed Silicon Valley Pico Power Project.

In addition, the data we have reviewed indicate that the correlation between fuel sulfur content and stack PM_{10} emissions is not as direct as the Staff suggests. The attached table (Attachment AQ-1) summarizes test results for fuel sulfur content, measured stack SO_2 and measured PM_{10} emissions for four natural gas-fired gas turbine facilities tested over several years.[2] While there is clearly a scientific relationship between fuel sulfur content and PM_{10} emissions, in that whatever is not emitted as SO_2 will be emitted in a form that should be captured as particulates, it is difficult to see the relationship in this empirical data. If there were a direct correlation between fuel sulfur content and PM_{10} emissions, one would expect to see a lower PM_{10} emission rate where the data show a high percentage conversion of fuel sulfur to SO_2, and vice-versa (all else being equal). However, a review of the data available for comparison indicate that for the seven cases in which the S to SO_2 conversion is less than 10% (suggesting a high particulate emission rate), the PM_{10} emission rates range between 2 lbs/hr and 8 lbs/hr—essentially covering the range for the entire data set. Among the tests where there are corresponding PM_{10} results, the highest fuel sulfur level (0.215 grains) is associated with a PM_{10} emission rate of 4.1 lbs/hr, while the lowest fuel sulfur level (0.071 grains, excluding the Moss Landing sulfur data) is associated with a PM_{10} emission rate of 3.3 lbs/hr – suggesting a weak correlation. The Moss Landing fuel sulfur data suggest that the lowest fuel sulfur levels are associated with a range of PM_{10} emission rates between 1 and 10 lbs/hr, suggesting no correlation.

[2] For the sake of simplicity, turbine PM_{10} emissions are expressed on a lbs/hr basis because all of the turbines in the table are of the same class; the duct burner contribution to PM_{10} is ignored.

The conclusion we draw from these data is that there is so much variability in both the fuel sulfur measurements and the PM_{10} measurements that a meaningful relationship is not possible to construct.

Finally, it is important to emphasize that a change in sulfur content limitation will not result in any increase in SO_2 emissions from the facility. LECEF gets its fuel from a pipeline, and while this natural gas must meet certain specifications to qualify as pipeline natural gas, LECEF cannot specify a maximum sulfur content for pipeline gas as it can for a refined product such as distillate fuel. LECEF must take the gas that is delivered, and the sulfur content of natural gas in California is known to vary to a certain extent. The spreadsheet analysis discussed above shows that the measured sulfur content of the gas delivered to four northern California power plants varies from 0.127 to 0.266 grains per 100 scf at the same plant. LECEF is attempting to manage the uncertainty inherent in this variation by proposing, and analyzing, a higher fuel sulfur limit than what was originally permitted. We believe this approach is conservative and preferable to ignoring the potential for permit violations in the event that the sulfur content of the fuel is measured to be higher than expected.

Source Test Data

7. *Please provide an analysis of the all available source test results and continuous emissions monitoring data, with specific references, detailing how this data supports the proposed increased PM_{10} and SOx emissions limits.*

Response: Please see Response 3 for the requested information regarding PM_{10} source test data. Please see Response 6 for a discussion of the reason for the requested increase in allowable fuel sulfur content.

Proposed Calculations

8. *Table 8.1-B1-2 in the LECEF2 AFC lists the Stack Diameter and Exhaust Velocity. Table 8.1B-2 in the original LECEF1 AFC is similar but lists different values for both Stack Diameter and Exhaust Velocity. The values used in the LECEF2 AFC appear to be "as built" values. Please clarify that the Stack Diameter and Exhaust Velocity used in Table 8.1-B1-2 of the LECEF2 AFC correctly reflect the existing facility and the facility as proposed in the Phase 1 relicensing.*

Response: The design drawings used in the original LECEF licensing proceeding showed a stack diameter of 11 feet. The exhaust velocities used in the original proceeding were calculated based on the design stack diameter. The values shown in the current AFC correctly reflect the as-built stack diameter of 11 feet, 4.5 inches. The change in stack diameter affects the calculated exhaust velocity.

Compliance with LORS

9. *Please provide a discussion of how the Phase 1 "relicensing" effort will remain in compliance with both condition AQ-38 and the District's permit.*

Response: Under the Phase 1 relicensing effort, the existing BAAQMD air permit will be replaced by a new permit that does not include Condition 38. Condition 38 was included in the air permit to reflect the requirements of Public Resources Code Section 25552(e)(5), which applies only to simple-cycle facilities licensed under the emergency siting provisions of Section 25552. As LECEF is being relicensed under the CEC's regular 12-month process, the requirements of Section 25552(e)(5) will not apply.

Preliminary Modeling Analysis

10. *Staff checked the listed "Fenceline Receptors" starting on line 379 of the modeling file "LE00_01B.dat". The four corners of the coordinate set are marked on the map below.*

    The UTM coordinates used for the facility boundary appear to be displaced slightly to the south of of the actual facility location. Preliminary investigation indicates that all coordinates used in the modeling (i.e. for both Phase 1 and Phase 2) were displaced in this manner. Please check the modeling receptor locations for accuracy and provide a discussion of this apparent error and if remodeling is necessary.

Response: Applicant is using the NAD 27 coordinate system to locate the facility and all receptors. The CEC Staff is using NAD 84. If the receptors are replotted using the NAD 27 coordinate system, we believe the Staff will agree that no displacement has occurred.

Automatic Generation Control (AGC)

11. *Will the Phase 2 Los Esteros Critical Energy Facility have an AGC agreement with the ISO?*

Response: Please see the response to Data Request #1.

AGC and Emissions Compliance

12. *If such an agreement is planned, please provide an analysis of any impacts the AGC will have on the projects ability to comply with all emissions limits.*

Response: Please see Response 2.

ATTACHMENT AQ-1

Summary of Test Results for Fuel Sulfur Content, Stack SO_2 and PM_{10} Emissions

Fuel Sulfur Conversion Analysis

Numbers in italics are estimated; numbers in bold are detection limits where values were below detection limits

Plant Data: Facility	Unit	SCR	OxCat	DB	Fuel	Date	Run	Fuel S: ppmw as S	ppmv as S	Fuel S gr/100 scf	Method	Heat Input MMbtu/hr	Fuel HHV: btu/lb	btu/scf	Fuel Flow: lbs/hr	kscfh	Inlet Fuel S lbs/hr as S	Stack SO2: lbs/hr as SO2	lbs/MMbtu as SO2	lbs/hr as S	Method	Fuel S Conversion to SO2 percent	PM10 lbs/hr
Delta	1	Y	N	Y	NG	4/20/2002	1-PM-1	4.15	2.16	0.127	D5504	2033	22,934	1005	88,633	2,023	0.368	0.798	0.00020	0.399	EPA 8	108%	5.35
Delta	1	Y	N	Y	NG	4/20/2002	2-PM-1	4.15	2.16	0.127	D5504	2077	22,934	1005	90,557	2,066	0.376	0.818	0.00020	0.409	EPA 8	109%	5.94
Delta	1	Y	N	Y	NG	4/21/2002	3-PM-1	4.15	2.16	0.127	D5504	2102	22,934	1005	91,642	2,091	0.381	0.908	0.00022	0.454	EPA 8	119%	4.91
Delta	2	Y	N	Y	NG	4/21/2002	1-PM-2	4.22	2.23	0.131	D5504	2113	22,934	1020	92,155	2,072	0.389	0.725	0.00017	0.363	EPA 8	93%	1.91
Delta	2	Y	N	Y	NG	4/21/2002	2-PM-2	4.22	2.23	0.131	D5504	2058	22,934	1020	89,747	2,018	0.379	1.026	0.00025	0.513	EPA 8	135%	3.04
Delta	2	Y	N	Y	NG	4/22/2002	3-PM-2	4.22	2.23	0.131	D5504	2054	22,934	1020	89,571	2,014	0.378	0.550	0.00013	0.275	EPA 8	73%	2.16
Delta	3	Y	N	Y	NG	4/26/2002	1-PM-3	6.17	3.21	0.189	D5504	2106	22,934	1005	91,810	2,095	0.567	0.673	0.00016	0.336	EPA 8	59%	2.51
Delta	3	Y	N	Y	NG	4/26/2002	2-PM-3	6.17	3.21	0.189	D5504	2101	22,934	1005	91,615	2,091	0.565	1.245	0.00030	0.623	EPA 8	110%	2.46
Delta	3	Y	N	Y	NG	4/26/2002	3-PM-3	6.17	3.21	0.189	D5504	2079	22,934	1005	90,654	2,069	0.559	1.400	0.00034	0.700	EPA 8	125%	2.12
Delta	1	Y	N	Y	NG	10/3/2003	1-SO2-1	8.52	*4.50*	0.266	D5504	2050	*22,900*	1020	89,515	2,010	0.763	0.078	0.00002	0.039	EPA 8	5%	
Delta	1	Y	N	Y	NG	10/3/2003	2-SO2-1	8.52	*4.50*	0.266	D5504	2038	*22,900*	1020	88,978	1,998	0.758	0.078	0.00002	0.039	EPA 8	5%	
Delta	1	Y	N	Y	NG	10/3/2003	3-SO2-1	8.52	*4.50*	0.266	D5504	2025	*22,900*	1020	88,432	1,985	0.753	0.308	0.00008	0.154	EPA 8	20%	
Delta	2	Y	N	Y	NG	9/30/2003	1-SO2-2	8.52	4.50	0.266	D5504	1946	*22,900*	1020	84,974	1,908	0.724	0.296	0.00008	0.148	EPA 8	20%	
Delta	2	Y	N	Y	NG	9/30/2003	2-SO2-2	8.52	4.50	0.266	D5504	1913	*22,900*	1020	83,520	1,875	0.712	0.073	0.00002	0.036	EPA 8	5%	
Delta	2	Y	N	Y	NG	10/1/2003	3-SO2-2	8.52	*4.50*	0.266	D5504	1953	*22,900*	1020	85,284	1,915	0.727	0.595	0.00015	0.297	EPA 8	41%	
Delta	3	Y	N	Y	NG	9/30/2003	1-SO2-3	8.52	4.50	0.266	D5504	1929	*22,900*	1020	84,214	1,891	0.718	0.147	0.00004	0.074	EPA 8	10%	
Delta	3	Y	N	Y	NG	9/30/2003	2-SO2-3	8.52	4.50	0.266	D5504	1902	*22,900*	1020	83,074	1,865	0.708	0.145	0.00004	0.073	EPA 8	10%	
Delta	3	Y	N	Y	NG	10/1/2003	3-SO2-3	8.52	*4.50*	0.266	D5504	1987	*22,900*	1020	86,751	1,948	0.739	0.529	0.00013	0.265	EPA 8	36%	
Moss	1	Y	N	N	NG	6/24/2002	1-T-10	1.00	**0.55**	0.032	D3246	2036	*22,524*	*1036*	90,386	1,965	0.090	0.114	0.00003	0.057	EPA 8	63%	8.90
Moss	1	Y	N	N	NG	6/24/2002	1-T-11	1.00	**0.55**	0.032	D3246	2036	*22,524*	*1036*	90,386	1,965	0.090	0.356	0.00009	0.178	EPA 8	197%	5.84
Moss	1	Y	N	N	NG	6/24/2002	1-T-12	1.00	**0.55**	0.032	D3246	2030	*22,524*	*1036*	90,133	1,960	0.090	0.113	0.00003	0.057	EPA 8	63%	6.70
Moss	2	Y	N	N	NG	6/27/2002	2-T-10	1.00	**0.55**	0.032	D3246	1870	*22,524*	*1036*	83,017	1,805	0.083	0.070	0.00002	0.035	EPA 8	42%	4.73
Moss	2	Y	N	N	NG	6/27/2002	2-T-11	1.00	**0.55**	0.032	D3246	1865	*22,524*	*1036*	82,792	1,800	0.083	0.138	0.00004	0.069	EPA 8	83%	3.71
Moss	2	Y	N	N	NG	6/27/2002	2-T-12	1.00	**0.55**	0.032	D3246	1862	*22,524*	*1036*	82,663	1,797	0.083	0.051	0.00001	0.026	EPA 8	31%	0.71
Moss	3	Y	N	N	NG	7/23/2002	3-T-10	1.00	**0.53**	0.031	D3246	1775	*22,814*	*1012*	77,816	1,754	0.078	0.096	0.00003	0.048	EPA 8	62%	10.33
Moss	3	Y	N	N	NG	7/23/2002	3-T-11	1.00	**0.53**	0.031	D3246	1774	*22,814*	*1012*	77,777	1,753	0.078	0.105	0.00003	0.052	EPA 8	67%	8.08
Moss	3	Y	N	N	NG	7/23/2002	3-T-12	1.00	**0.53**	0.031	D3246	1777	*22,814*	*1012*	77,904	1,756	0.078	0.275	0.00008	0.137	EPA 8	177%	7.68
Moss	4	Y	N	N	NG	7/9/2002	4-T-10	1.00	**0.53**	0.031	D3246	1771	*22,814*	*1012*	77,628	1,750	0.077	0.012	0.00000	0.006	EPA 8	8%	8.03
Moss	4	Y	N	N	NG	7/9/2002	4-T-11	1.00	**0.53**	0.031	D3246	1767	*22,814*	*1012*	77,452	1,746	0.077	0.040	0.00001	0.020	EPA 8	26%	3.07
Moss	4	Y	N	N	NG	7/9/2002	4-T-12	1.00	**0.53**	0.031	D3246	1765	*22,814*	*1012*	77,369	1,744	0.077	0.068	0.00002	0.034	EPA 8	44%	10.28
SPA	1	Y	Y	Y	NG	11/13/1997	1	8.71	4.67	0.276		*1257*	*22,900*	1035	54,891	1,215	0.478	0.540	0.00021	0.270	EPA 8	56%	
SPA	1	Y	Y	Y	NG	11/14/1997	1	6.77	3.63	0.214		*1257*	*22,900*	1035	54,891	1,215	0.372	0.560	0.00022	0.280	EPA 8	75%	
SPA	1	Y	Y	N	NG	8/12/1998	1	8.32	4.46	0.263		1141	*22,900*	1035	49,818	1,103	0.415	0.220	0.00010	0.110	EPA 8	27%	
Sutter	1	Y	Y	N	NG	1/8/2002	4	4.92	2.59	0.153	D5504	1908	23,213	1031	82,196	1,851	0.404	0.032	0.00001	0.016	EPA 8	4%	4.37
Sutter	1	Y	Y	N	NG	1/9/2002	5	5.61	2.94	0.173	D5504	1917	23,384	1032	81,979	1,857	0.460	0.064	0.00002	0.032	EPA 8	7%	3.87
Sutter	1	Y	Y	N	NG	1/9/2002	6	5.79	3.03	0.179	D5504	1915	23,384	1032	81,894	1,855	0.474	0.036	0.00001	0.018	EPA 8	4%	3.83
Sutter	1	Y	Y	Y	NG	1/10/2002	4	6.33	3.36	0.198	D5504	2030	23,183	1037	87,565	1,959	0.555	0.030	0.00001	0.015	EPA 8	3%	2.03
Sutter	1	Y	Y	Y	NG	1/11/2002	5	6.90	3.65	0.215	D5504	2032	22,962	1024	88,495	1,985	0.611	0.058	0.00001	0.029	EPA 8	5%	4.13
Sutter	1	Y	Y	Y	NG	1/11/2002	6	6.35	3.36	0.198	D5504	2015	22,962	1024	87,755	1,969	0.558	0.018	0.00000	0.009	EPA 8	2%	2.32
Sutter	2	Y	Y	N	NG	1/30/2002	4	6.40	3.37	0.199	D5504	1844	22,697	1007	81,244	1,832	0.520	0.140	0.00004	0.070	EPA 8	13%	7.96
Sutter	2	Y	Y	N	NG	1/31/2002	5	6.43	3.36	0.198	D5504	1851	22,870	1008	80,935	1,837	0.520	0.140	0.00004	0.070	EPA 8	13%	6.67
Sutter	2	Y	Y	N	NG	2/1/2002	6	5.46	2.89	0.170	D5504	1850	22,759	1015	81,285	1,822	0.444	0.140	0.00004	0.070	EPA 8	16%	5.58
Sutter	2	Y	Y	Y	NG	2/2/2002	4	3.14	1.65	0.097	D5504	1980	22,761	1009	86,992	1,962	0.273	0.121	0.00003	0.061	EPA 8	22%	5.08
Sutter	2	Y	Y	Y	NG	2/2/2002	5	3.28	1.70	0.100	D5504	1987	23,267	1016	85,400	1,955	0.280	0.120	0.00003	0.060	EPA 8	21%	3.25
Sutter	2	Y	Y	Y	NG	2/3/2002	6	2.32	1.20	0.071	D5504	2023	23,267	1016	86,947	1,991	0.201	0.125	0.00003	0.063	EPA 8	31%	3.34
Averages								4.87	2.57	0.152		1907	22,888	1020	83,305	1,870	0.402	0.315	0.00008	0.16		50%	4.88

Technical Area: Biological Resources (13-29)

Nitrogen Emissions

13. *Review Table BR-1 (attached) for accuracy and provide comments on any discrepancies or additional data your staff has on nitrogen amounts.*

Response: The quantities of nitrogen emitted from Phases 1 and 2 of the LECEF project are shown in the AFC as follows:

Table DR13-1
Nitrogen Emissions, Phases 1 and 2

Project Phase	Tons/yr as NOx or NH_3	Tons/yr as N	Reference
NOx			
Phase 1	74.9	22.8	Table 8.1-18 of AFC
Phase 2	99.0	30.2	Table 8.1-39 of AFC
NH_3			
Phase 1	110.9	91.3	Table 8.1-19 of AFC
Phase 2	118.0	97.2	Table 8.1-41 of AFC
Total			
Phase 1	n/a	114.1	
Phase 2	n/a	127.4	

The ammonia emission rate from Phase 1 of 166.4 tons/year cited in Table BR-1 was in error; the correct ammonia emission rate for Phase 1 is 110.9 tons/yr. The correct ammonia emission rate of 110.9 tons/yr was used in the original nitrogen deposition modeling analysis for Phase 1, and is reflected in the FDOC issued by the BAAQMD, and in the CEC's final decision, for the Phase 1 project.

Ammonia Emissions

14. *Table 8.1A1-5 of the LECEF Phase 2 AFC lists the "Total Annual Emissions, 4 turbines" of ammonia as 110.9 tpy. However, the original LECEF Phase 1 AFC, in Table 8.1-14 (pg. 8.1-26) reports the annual ammonia emissions as 332,705 lb/year (166.35 tpy). Provide a calculation with a written explanation that shows how LECEF ammonia emissions rates were calculated to be 166.4 tons per year during the previous proceeding. Then provide analysis of why this number is now 110.9 and why 166.4 is not valid for use in the current proceeding.*

Response: The ammonia emission rate of 166.4 tons per year originally provided for the previous proceeding was in error because it was calculated based on six turbines, not four. The correct emission rate, which is reflected in both the BAAQMD FDOC/Authority to Construct and the CEC Final Decision for the project, is 110.9 tons per year. This emission rate is calculated as follows:

$$(10.0 \text{ ppmvd})(20.9\text{-}0)/(20.9 - 15) = 35.42 \text{ ppmv } NH_3\text{, dry @ } 0\% \text{ O2}$$

$$(35.42/1{,}000{,}000)(1 \text{ lbmol}/385.3 \text{ dscf})(17.01 \text{ lb } NH_3))/\text{lbmol})(8600 \text{ dscf/MMBtu}) = 0.0134 \text{ lb } NH_3\text{/MMBtu}$$

$$0.0134 \text{ lb } NH_3\text{/MMBtu} * 472.6 \text{ MMBtu/hr}$$

= 6.33 lb NH_3/hr per turbine (see Table 8.1-A1-1)

6.33 lb/hr per turbine * 4 turbines * 8760 hrs/yr) 2000 lb/ton
= 110.9 tons NH_3/yr for four turbines

The erroneous calculation was:

6.33 lb/hr per turbine * 6 turbines * 8760 hrs/yr) 2000 lb/ton
= 166.35 tons NH_3/yr for six turbines

Quarterly Emissions Data

15. *For the months that the power plant was operational, provide for each month the total hours of normal operation, the number of start-ups and shut downs, the average NOx emissions (pounds per day), and average ammonia slip rate (pounds per day) as gathered for use in each quarterly report to satisfy Condition of Certification AQ-22 from the LECEF Phase 1 Commission Decision (see also Condition of Certification AQ-34). If any of this information is proprietary, then submit this information under confidential cover.*

Response: Under Condition of Certification AQ-34, LECEF is required to submit the following data in each quarterly report:

- Daily and quarterly fuel use and corresponding heat input rates; and
- Daily and quarter mass emission rates for all criteria pollutants during normal operations and during other periods (startup/shutdown, breakdown).

These conditions do not require the reporting of hours of operation or the number of startups and shutdowns. Therefore only daily and quarterly NOx and NH_3 emissions are gathered for use in the quarterly reports.

One quarterly report has been submitted so far to the BAAQMD and the CEC, as the BAAQMD staff indicated that reporting under this condition was not required until the permit to operate (PTO) was issued for the facility. The PTO was issued in September 2003, so the following information is provided for the fourth quarter of 2003. Quarterly NOx and NH_3 emissions for each CTG are summarized below; the daily NOx and NH_3 emissions for each CTG are provided in Attachment BIO-1.

Table DR15-1
LECEF NOx and Ammonia Emissions by CTG, Quarterly Summary, 4th Quarter 2003

Constituent	Unit 1	Unit 2	Unit 3	Unit 4
NOx, pounds	1,546.5	1,652.8	2,999.8	2,163.6
NH_3, pounds	258.1	166.1	246.0	223.4

Ammonia slip rates are measured during compliance testing. The following ammonia slip rates were reported to the BAAQMD in the May 14, 2003, test report for the initial compliance tests that were performed March 12-18, 2003.

Table DR15-2
LECEF Ammonia Slip Rates, Initial Compliance Tests

	Ammonia Slip Level, ppmvd @ 15% O_2			
CTG No.	**Test 1**	**Test 2**	**Test 3**	**Average**
1	0.31	1.47	3.07	1.62
2	0.16	0.24	7.23	2.54
3	0.49	0.42	0.54	0.48
4	1.12	1.23	0.86	1.07

Phase 1 Nitrogen Deposition

16. *Explain if the nitrogen deposition from Phase 1 will be equal to the modeling done during the previous license review even when taking into account the higher start-up emissions, the change in exhaust velocity, and the reduction in ammonia emissions.*

Response: The nitrogen deposition modeling for Phase 1 was based on the maximum allowable annual NOx and ammonia emissions from the combustion turbines of 74.9 tons/yr and 110.9 tons/yr, respectively. Nitrogen deposition is expressed in units of kg/hectare/year—also on an annual basis. As the Applicant is not requesting any changes in maximum allowable annual NOx or NH_3 emissions from the combustion turbines for Phase 1, there would be no change in the modeling parameters used in evaluating nitrogen deposition impacts and therefore no change in modeling results. As noted in Responses 1 and 2 above, the correct annual ammonia emission rate of 110.9 tons/yr for Phase 1 was used in the original nitrogen deposition modeling analysis, and no reduction in ammonia emissions is being proposed for the relicensing of Phase 1.

Finally, turbine startups are short-term, transient events and the effect of changes in stack parameters during startups on ambient impacts are not considered in annual average analyses, even for much larger turbines for which startups can require up to six hours.

The analyses provided for the original Phase 1 proceeding were extremely conservative, and have substantially overstated emissions and nitrogen deposition impacts. Compared with the maximum annual NOx emission rate of 74.9 tons per year that was analyzed, actual NOx emissions (as determined by continuous emissions monitoring) were only 4.2 tons during the 4th quarter of 2003. This is equivalent to 16.7 tons per year, if extrapolated to an annual basis, less than 25% of the allowable NOx emissions from the project. Similarly, as shown in Data Response 3, actual ammonia emissions are estimated to have been less than 0.5 tons during the last quarter of 2003. This is equivalent to less than 2 tons per year, if extrapolated to an annual basis, compared with the 110.9 ton per year value that was evaluated. Nonetheless, consistent with Bay Area AQMD and CEC practice, we will continue to evaluate worst case air quality and nitrogen deposition impacts based on the maximum allowable emission rates of 74.9 tons per year and 110.9 tons per year for NOx and ammonia, respectively.

The slight change in exhaust velocity due to the slight change in stack diameter is not expected to have any discernible effect on nitrogen deposition.

Nitrogen Deposition Modeling

17. *If the nitrogen deposition modeling results for Phase 1 would not be the same, provide an analysis of the natural gas-fired combustion turbines in simple cycle configuration with the emissions of*

the fire pump using a U.S. Fish and Wildlife Service (USFWS)-approved model 3. The analysis should specify the amount of nitrogen deposition in the units kg/ha/year and the amount of deposition expected at potentially affected serpentine soils (such as Coyote Ridge and Tulare Hill). Provide an isopleth graphic over a USGS 7.5 minute quadrangle maps (or equally detailed map or more current map) of the direct deposition values (not weighted average). Identify on the maps the boundaries of the critical habitat for Bay checkerspot butterfly (Federal Register, April 30, 2001).

Response: As discussed in Response 4, the modeling results for Phase 1 will not change, as no changes in annual NOx or NH_3 emissions are proposed for Phase 1.

Nitrogen Deposition

18. *Provide current information on the level of nitrogen deposition (differentiate wet and dry deposition) in the project area and the source for this information (e.g., a complete copy of the paper or report cited).*

Response: Measurements of nitrogen deposition were recently taken at the Calpine Metcalf Energy Center Ecological Preserve, located approximately 7 miles south of the LECEF site and reported in the document titled *Year 2-Initial Baseline Monitoring, Annual Monitoring Report for the Metcalf Energy Center Ecological Preserve, Santa Clara County, California*, prepared by CH2M Hill for the Land Trust for Santa Clara County. Chapter 4 of this document is a report of the findings of the nitrogen deposition monitoring work and is attached to this document as Attachment BIO-2. The full report is available on request.

Nitrogen Calculations

19. *Provide the complete calculation (e.g., the amounts used) for the statement that the Phase 2 results in only a 15% increase over Phase 1 conditions (page 8.2-22 of the AFC). Provide what the emission levels were used to make this estimate and the assumptions behind these emission levels (e.g., the number of hours, the ppm, etc.).*

Response: The calculation is as follows:

NOx emissions:

99.0 tons/yr (proposed annual limit for CTGs and duct burners, from Table 8.1-39)

Ammonia emissions:

0.0134 lb NH_3/MMBtu[4] * 500.0 MMBtu/hr (without duct firing)
= 6.70 lb NH_3/hr per CTG (without duct firing) (see Table 8.1-A2-1)

0.0134 lb NH_3/MMBtu * 639.0 MMBtu/hr (with duct firing)
= 8.56 lb NH_3/hr per CTG (with duct firing) (see Table 8.1-A2-1)

((6.70 lb NH_3/hr * 7510 hrs/yr) + (8.56 lb NH_3/hr * 1250 hrs/yr)) * 4 CTGs) 2000 lb/ton
= 118.0 tons NH_3/yr for four CTGs

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[3] Nitrogen deposition analysis in the previous proceeding used the Industrial Source Complex Short Term Version 3 (ISCST3) model. The model assumed the same parameters as those done for Metcalf Energy Project Nitrogen Impact Analyses (available by request): 100% conversion of ammonia and oxides of nitrogen into depositional nitrogen, 80% dry deposition, and operation at highest number of hours. The Energy Commission is currently funding an analysis of the various air dispersion models. If Calpine will propose a different model be used in this proceeding, these results should be discussed with USFWS before choosing a final model.

[4] Calculation of lb/MMBtu emission factor for NH_3 shown in Response 2.

N from NOx:

99.0 tons NOx /yr * 14.01 lb N/46.01 lb = 30.2 tons/yr N from NOx

N from NH_3:

118.0 tons NH_3/yr * 14.01 lb N/17.01 lb NH_3 = 97.2 tons/yr N from NH_3

Total N from Phase 2:

30.2 tons/yr N from NOx + 97.2 tons/yr N from NH_3 = 127.4 tons/yr N

Increase in N over Phase 1:

(127.4 tons/yr N from Phase 2 – 114.1 tons/yr N from Phase 1)/114.1 tons/yr

= 11.7%

Nitrogen Deposition from Phase 2

20. *Explain if the nitrogen deposition from Phase 2 would be different than the amount modeled during the previous license review when taking into account the duct-firing, higher start-up emissions, the change in exhaust velocity, and the reduction in ammonia emissions.*

Response: Deposition from Phase 2 will not be the same as nitrogen deposition from Phase 1, because annual NOx and NH_3 emissions will be higher and combustion turbine exhaust temperature and velocity will be lower for Phase 2 than the values used to evaluate Phase 1.

Nitrogen Deposition Modeling

21. *If the nitrogen deposition modeling results for Phase 2 would be different than previous modeling, provide an analysis of the natural gas-fired combustion turbines in combined cycle configuration with the emissions of the fire pump using a USFWS-approved model 1. The analysis should specify the amount of nitrogen deposition in the units kg/ha/year and the amount of deposition expected at potentially affected serpentine soils (such as Coyote Ridge and Tulare Hill). Provide an isopleth graphic over a USGS 7.5 minute quadrangle maps (or equally detailed map or more current map) of the direct deposition values (not weighted average). Identify on the maps the boundaries of the critical habitat for Bay checkerspot butterfly (Federal Register, April 30, 2001).*

Response: The Phase 2 nitrogen deposition analysis has been prepared based on the CEC-preferred ISCST3 model (version 02035). Model assumptions were identical to those used in the previous analysis approved by the Commission during the original Phase 1 licensing, with the following changes:

- Phase 2 emission rates and stack parameters were used, consistent with the air quality modeling assumptions described in Section 8.1 of the AFC.
- Meteorological data from the Alviso WWTP (San Jose/Santa Clara WPCP) were used, consistent with the methodology described in Section 8.1 of the AFC. After 1995, the direct solar radiation data required for modeling deposition is no longer being either routinely monitored or recorded at first-order National Weather Service (NWS) station sites like San Francisco. The BAAQMD Alviso modeling met data used for the LECEF air quality modeling was for the period 1996-2000. However, we had to reach farther back in time to use a 1995 Alviso met set in conjunction with NWS San Francisco 1995 direct solar radiation and rainfall data to create a combined Alviso/San Francisco met set suitable for modeling deposition.

Based on these results, Table DR21-1 updates the summary of nitrogen deposition rates to butterfly critical habitats that was presented in the December 2001 "Impact Analysis for Los Esteros Critical Energy Facility NOx Emissions."

Table DR21-1
Nitrogen Deposition To Butterfly Critical Habitats, Phase 2 Analysis

Site Name	Site Area (acres)	Area of Serpentine Habitat	Average Deposition (kg/ha-yr)	Fraction of Background Deposition	Total N (kg/yr)	Total N (kg/ha/yr)	Percent Deposition x Site Area (ac)
Bear Ranch	617	617	0.0073	0.0009	1.833	0.0030	0.54
Communication Hill	442	369	0.0340	0.0040	5.075	0.0138	1.79
Kalana Hills	244	82	0.0162	0.0019	0.537	0.0066	0.47
Kirby	6912	3746	0.0147	0.0018	22.315	0.0060	12.11
Morgan Hill	724	431	0.0196	0.0023	3.423	0.0079	1.69
Metcalf	3351	1224	0.0120	0.0014	5.942	0.0049	4.79
San Felipe	998	595	0.0166	0.0020	4.008	0.0067	1.98
Silver Creek	787	400	0.0097	0.0012	1.573	0.0039	0.91
San Vicente-Calero	1875	272	0.0118	0.0014	1.295	0.0048	2.63
Santa Theresa Hills	4500	1296	0.0166	0.0020	8.703	0.0067	8.89
San Martin	586	586	0.0305	0.0036	7.234	0.0123	2.13
Tulare Hill	876	308	0.0214	0.0025	2.669	0.0087	2.23
Total	21,326	9,926	0.0161	0.0019			40.15

The requested isopleth for the Phase 2 Analysis is included as Figure DR21-1 (Attachment BIO-3).

Electronic copies of the input and output files for the Phase 2 nitrogen deposition analysis are being provided to the Commission under separate cover.

Cumulative Projects

22. *Provide a table of cumulative projects that will be considered in the air quality analysis (see AFC's Appendix 8.1-F2). Using Data Response 154 from the original LECEF proceeding (01-AFC-12) as a guide, provide the amount of nitrogen emitted from each of the projects. Once all projects have been identified and emissions calculated, prepare an analysis of how the nitrogen emitted from these projects compares to the simple cycle power plant and then to the combined cycle power plant.*

Response: The BAAQMD response to our request for facilities within a six-mile radius for which ATCs have been issued for which have not yet commenced operation is attached. This list includes only two facilities with NOx emissions in excess of 5 tons per year, which is the minimum level for which cumulative impacts may be considered potentially significant.

After consultation with the BAAQMD staff, it was determined that one of the two facilities, Tri-Cities Recycling, has cancelled its ATC. Therefore, this facility has been eliminated from the cumulative impacts analysis and the only facility to be included is the Silicon Valley Pico Power Plant. The Pico Power Plant has maximum permitted annual NOx and NH_3 emissions of 43.3 and 59.4 tons/yr, respectively. These allowable emission rates correspond to:

43.3 tons NOx/yr * 14.01/46.01 = 13.2 tons N/yr from NOx

59.4 tons NH_3/yr * 14.01/17.01 = 48.9 tons N/yr from NH_3

For a total of 13.2 + 48.9 = 62.1 tons N/yr from the Pico Power Plant.

This compares to 114.1 tons N/yr from LECEF Phase 1 (54%) and 127.4 tons N/yr from LECEF Phase 2 (49%).

Ammonia Sources

23. *Provide information on some of the other cumulative projects that are ammonia sources in the air basin that may be contributing to nitrogen deposition on critical habitat for Bay checkerspot butterfly. Provide a brief analysis of the largest sources and compare them to the operations of the simple cycle and then the combined cycle power plant. Analysis should include information on stack height for stationary sources, the application amount and spray height for agriculture sources, and distance to the critical habitat areas.*

Response: In 2003 the BAAQMD published a 2001 annual report on its Toxic Air Contaminant Control Program. This report includes summaries of emissions of TACs, including ammonia, by facility for facilities emitting more than 19,300 lbs/yr (9.65 tons/yr). The summary for ammonia emissions, from Appendix B-2 of the report, is reproduced below as Table DR23-1. Note that the emissions shown for other BAAQMD facilities are actual emissions reported to the District for 2001, while emissions shown for LECEF Phases 1 and 2 are maximum allowable emissions.

The TAC report does not provide any information regarding the sources of ammonia at these facilities, regarding agricultural sources of ammonia, or about stack height or spray height.

POC and Nitrogen Deposition

24. *Staff understands that precursor organic compound ERCs were purchase instead of nitrogen oxide ERCs for LECEF Phase 1 (see Commission Decision, page 119). Provide an explanation of how these credits minimize nitrogen deposition.*

Response: All of the ERCs for the simple-cycle facility and a portion of the ERCs for the combined-cycle facility are in the form of POC. These emission reductions were not claimed to have any effect on nitrogen deposition.[5] The Applicant did not claim any credit for mitigating nitrogen deposition impacts from the ERCs that were provided for the project. Rather, the *Impact Analysis* demonstrated that the impacts of potential nitrogen deposition from the LECEF project would be immeasurable. Nevertheless, to help alleviate possible incremental degradation of serpentine habitats that support Bay checkerspot butterfly and other species, the Applicant placed a total of 40 acres of critical serpentine habitat in a conservation easement to compensate for possible nitrogen deposition contributions to serpentine soils, provided an endowment sufficient to pay for the management of the easement area in perpetuity, and undertook other conservation measures.

[5] Reductions in POC emissions have the effect of reducing ozone levels which, in turn, results in a lessening of the potential for nitrogen deposition due to the slowing of the conversion of NOx emissions into a depositional form, such as HNO_3. However, neither the analysis provided for the previous AFC, nor the current analysis, takes credit for this benefit.

Table DR23-1
Summary of Ammonia Emissions for Bay Area Facilities

Facility Name/Location	NH_3 Emissions, tons/yr	Annual NH_3 Emissions as Percentage of LECEF Simple Cycle/Combined Cycle Emissions	Distance from Nearest Critical Habitat Area (mi)
San Jose/Santa Clara Water Pollution Control Plant	420	379%/330%	10 mi
Valero Refining Company, Benicia	165	149%/130%	54 mi
Crockett Cogeneration, Crockett	160	144%/122%	45 mi
Owens Corning, Santa Clara	155	140%/122%	7 mi
Chevron Products Company, Richmond	85	77%/67%	51 mi
ConocoPhillips, Rodeo	60	54%/47%	55 mi
GWF Power Systems, LP, Antioch	43.5	39%/34%	49 mi
East Bay Municipal Utility District, Oakland	38	34%/30%	40 mi
Pycon, Inc, Santa Clara	27	24%/21%	6 mi
Central Contra Costa Sanitary District, Martinez	19.5	18%/15%	51 mi
City of Benicia, Benicia	19	17%/15%	54 mi
Sanmina Corporation, San Jose	14.5	13%/11%	4 mi
Fairfield Suisun Sewer District, Fairfield	13.5	12%/11%	66 mi
GWF Power Systems, LP, Antioch	13	12%/10%	50 mi
GWF Power Systems, LP, Pittsburg	13	12%/10%	50 mi
Union Sanitary District, Union City	12.5	11%/10%	22 mi
GWF Power Systems, LP, Pittsburg	12.5	11%/10%	50 mi
South Bayside System Authority, Redwood City	11	10%/9%	24 mi
GWF Power Systems, LP, Bay Point	11	10%/9%	50 mi
Sanmina—Santa Clara, Santa Clara	10.5	9%/8%	6 mi
Total Ammonia Emissions in BAAQMD	**1,400**	**1260%/1099%**	

Source: Bay Area Air Quality Management District, 2003. 2001 Annual Report of the Toxic Air Contaminant Control Program, Appendix B-2.

Phase 2 ERCs

25. *Describe when the Emission Reduction Credits for NOx will be purchased for Phase 2, what is their most likely location in relation to the power plant (e.g, direction and number of miles), and at what ratio they will be purchased. Describe if these credits are already part of an existing bank, or if a new source is being proposed. Differentiate NOx credits from precursor organic compound credits in your answer.*

Response: The Applicant already owns the NOx and POC ERCs that are expected to be used to offset the emissions increases for Phase 2. The ERCs that are expected to be used for the project are shown in Table 8.1-60 of the AFC. A total of 34.67 tons/yr of offsets are required (NOx + POC), and these offsets are expected to be provided in the form of 8.1 tons/yr of NOx and 26.57 tons/yr of POC. The locations and quantities of NOx ERCs are shown in the following table:

Table DR24-1
Emission Reduction Credits for NOx

Cert. No.	NOx, tpy	Origin	Date Created*	Dist. to LECEF
724	7.1	Cardinal Cogeneration, Palo Alto	3/13/96	13.3 mi E
822	1.0	Philips Semiconductor, Sunnyvale	8/6/93	7.0 mi NE

*Indicates date ERC originally approved by the BAAQMD.

Gilroy Energy Center Retrofit Status

26. *Provide the status of the retrofit of the Gilroy Energy Facility that was initially accepted as a potential source of Emission Reduction Credits for NOx in October 2001 by the Bay Area Air Quality Management District. Have these Credits been accepted by the Bay Area Air Quality Management District?*

Response: The SCR retrofit to the combined-cycle gas turbine at Gilroy Energy Facility was not pursued. No Emission Reduction Credits have been sought from or granted by the BAAQMD for the project.

USFWS Permit

27. *Should the USFWS determine that a "take" permit is required for LECEF Phase 1 re-licensing or Phase 2, submit a schedule to obtain a "take" permit.*

Response: On March 26, 2004 CEC Staff (Mr. Terrence O'Brien) transmitted a letter to Ms. Jan Knight of the U.S. Fish and Wildlife Service (USFWS). The March 26 letter requested the USFWS to "review the current AFC and provide comments, including early indication of need, if any, for formal consultation with regard to the federal Endangered Species Act." Upon receipt of USFWS' response, Applicant will work with CEC Staff and the USFWS to determine if a take permit is required and, if so, to develop a schedule to obtain such permit.

Burrowing Owl

28. *Describe what impacts could occur if burrowing owls were present during the construction of the combined cycle elements of the project and describe what impacts could occur to the mitigation lands. Differentiate permanent and temporary impacts in your response.*

Response: The mitigation lands proposed for the burrowing owl are located southwest of the power plant and along both sides of Thomas Foon Chew Way, the access road to LECEF. Construction of LECEF Phase 2 involves using areas to the south of the southern LECEF boundary and fenceline for construction laydown and worker parking. The mitigation lands are to be mowed and managed for burrowing owl foraging habitat. Construction of Phase 2 will not affect this. Phase 2 construction activity south of the LECEF fenceline in the laydown area could affect burrowing owls if they were present and active in the area or nesting during the construction. This impact would be temporary, however, and could be avoided or minimized by following the measures described in the response to Data Request 29. No permanent impacts are expected.

Burrowing Owl Avoidance Measures

29. *If there are potential impacts, propose avoidance and minimization measures that will be used for burrowing owls (if present) and the mitigation lands for this species during the construction of the combined cycle elements of the project.*

Response: The avoidance measures taken will be to conduct a pre-construction survey for burrowing owls a minimum of 24 hours before construction starts. If owls are found on site and are nesting or young owls are fledging, project construction activity will maintain a distance of 250 feet from the nest location. If owls are present and are not actively nesting or fledging (juveniles), passive relocation techniques will be used to move the owls to a safe location. Measures to be used are similar to those described in the Preconstruction Survey Protocol and Mitigation Plan included as Appendix C to the Biological Resources Monitoring and Mitigation Plan for LECEF Phase 1.

ATTACHMENT BIO-1

Daily NOx and NH_3 Emissions

Daily Summary

	Unit 1 NOx @ 15%(PPM)	Unit 1 Nox(#/HR)
10/1/2003	2.40	29.1
10/2/2003	0.00	0
10/3/2003	0.00	0
10/4/2003	0.00	0
10/5/2003	0.00	0
10/6/2003	3.00	69.2
10/7/2003	2.30	48.1
10/8/2003	0.00	0
10/9/2003	0.00	0
10/10/2003	0.00	0
10/11/2003	0.00	0
10/12/2003	62.30	57.1
10/13/2003	0.00	0
10/14/2003	4.10	66.9
10/15/2003	0.00	0
10/16/2003	0.00	0
10/17/2003	2.80	68.8
10/18/2003	3.40	31.1
10/19/2003	2.80	52.6
10/20/2003	2.20	57.7
10/21/2003	2.90	60.5
10/22/2003	3.20	37.7
10/23/2003	0.00	0
10/24/2003	2.50	50.4
10/25/2003	3.80	48.8
10/26/2003	2.50	53.7
10/27/2003	2.40	60.5
10/28/2003	2.30	62.6
10/29/2003	2.60	30
10/30/2003	0.00	0
10/31/2003	0.00	0
	Total:	**884.8**

	Unit 1 NOx @ 15%(PPM)	Unit 1 Nox(#/HR)
11/1/2003	0	0
11/2/2003	0	0
11/3/2003	2.4	33.5
11/4/2003	4.3	29.2
11/5/2003	0	0
11/6/2003	0	0
11/7/2003	3.9	24.9
11/8/2003	0	0
11/9/2003	0	0
11/10/2003	0	0
11/11/2003	0	0
11/12/2003	0	0
11/13/2003	0	0
11/14/2003	0	0
11/15/2003	0	0
11/16/2003	0	0
11/17/2003	0	0
11/18/2003	0	0
11/19/2003	2.7	38.5
11/20/2003	0	0
11/21/2003	0	0
11/22/2003	0	0
11/23/2003	0	0
11/24/2003	7.7	43.7
11/25/2003	2.6	35.2
11/26/2003	0	0
11/27/2003	0	0
11/28/2003	0	0
11/29/2003	0	0
11/30/2003	0	0
		205

	Unit 1 NOx @ 15%(PPM)	Unit 1 Nox(#/HR)
12/1/2003	5.5	41.2
12/2/2003	0	0
12/3/2003	0	0
12/4/2003	0	0
12/5/2003	0	0
12/6/2003	0	0
12/7/2003	0	0
12/8/2003	8	33.5
12/9/2003	4.9	55.6
12/10/2003	4.3	77.9
12/11/2003	3.6	38.9
12/12/2003	6.6	50.5
12/13/2003	0	0
12/14/2003	0	0
12/15/2003	2.2	31.2
12/16/2003	0	0
12/17/2003	5.3	19.8
12/18/2003	0	0
12/19/2003	0	0
12/20/2003	0	0
12/21/2003	0	0
12/22/2003	0	0
12/23/2003	0	0
12/24/2003	0	0
12/25/2003	0	0
12/26/2003	0	0
12/27/2003	0	0
12/28/2003	5.3	61.7
12/29/2003	3.2	46.4
12/30/2003	0	0
12/31/2003	0	0
		456.7

	Unit 2 NOx @ 15%(PPM)	Unit 2 Nox(#/HR)
10/1/2003	0	0
10/2/2003	0	0
10/3/2003	0	0
10/4/2003	0	0
10/5/2003	0	0
10/6/2003	3.8	74.1
10/7/2003	3.4	62.4
10/8/2003	0	0
10/9/2003	0	0
10/10/2003	0	0
10/11/2003	0	0
10/12/2003	4.8	96.2
10/13/2003	0	0
10/14/2003	11.9	98.1
10/15/2003	0	0
10/16/2003	0	0
10/17/2003	6.4	75.2
10/18/2003	2.8	40.2
10/19/2003	3.4	61.5
10/20/2003	2.9	66.6
10/21/2003	2.9	76.9
10/22/2003	3.3	47.4
10/23/2003	0	0
10/24/2003	2.6	42.7
10/25/2003	0.3	3.5
10/26/2003	0	0
10/27/2003	0	0
10/28/2003	0	0
10/29/2003	3.5	32.7
10/30/2003	0	0
10/31/2003	0	0
	Total:	**777.5**

	Unit 2 NOx @ 15%(PPM)	Unit 2 Nox(#/HR)
11/1/2003	0	0
11/2/2003	0	0
11/3/2003	3.6	42.8
11/4/2003	4.1	26.9
11/5/2003	0	0
11/6/2003	0	0
11/7/2003	7.6	48.7
11/8/2003	0	0
11/9/2003	0	0
11/10/2003	0	0
11/11/2003	0	0
11/12/2003	0	0
11/13/2003	0	0
11/14/2003	0	0
11/15/2003	0	0
11/16/2003	0	0
11/17/2003	0	0
11/18/2003	0	0
11/19/2003	0	0
11/20/2003	0	0
11/21/2003	0	0
11/22/2003	0	0
11/23/2003	5.1	52.3
11/24/2003	3.4	96.6
11/25/2003	7.7	44.8
11/26/2003	0	0
11/27/2003	0	0
11/28/2003	0	0
11/29/2003	0	0
11/30/2003	0	0
		312.1

	Unit 2 NOx @ 15%(PPM)	Unit 2 Nox(#/HR)
12/1/2003	4.3	47.1
12/2/2003	0	0
12/3/2003	0	0
12/4/2003	0	0
12/5/2003	0	0
12/6/2003	0	0
12/7/2003	0	0
12/8/2003	2.8	36.3
12/9/2003	2.7	48.6
12/10/2003	2.8	93.7
12/11/2003	3.2	57.8
12/12/2003	3	49.1
12/13/2003	0	0
12/14/2003	3	29.7
12/15/2003	2.6	33.4
12/16/2003	0	0
12/17/2003	3.4	32.9
12/18/2003	0	0
12/19/2003	0	0
12/20/2003	0	0
12/21/2003	0	0
12/22/2003	0	0
12/23/2003	0	0
12/24/2003	0	0
12/25/2003	0	0
12/26/2003	0	0
12/27/2003	0	0
12/28/2003	4.1	71.6
12/29/2003	3.9	63
12/30/2003	0	0
12/31/2003	0	0
		563.2

	Unit 3 NOx @ 15%(PPM)	Unit 3 Nox(#/HR)		Unit 3 NOx @ 15%(PPM)	Unit 3 Nox(#/HR)		Unit 3 NOx @ 15%(PPM)	Unit 3 Nox(#/HR)
10/1/2003	4.2	43.9	11/1/2003	0	0	12/1/2003	5.8	61
10/2/2003	0	0	11/2/2003	0	0	12/2/2003	0	0
10/3/2003	0	0	11/3/2003	25.2	70.3	12/3/2003	0	0
10/4/2003	0	0	11/4/2003	3.3	49.7	12/4/2003	0	0
10/5/2003	0	0	11/5/2003	0	0	12/5/2003	0	0
10/6/2003	4.9	148.9	11/6/2003	0	0	12/6/2003	0	0
10/7/2003	17.7	183.8	11/7/2003	7.5	40.3	12/7/2003	0	0
10/8/2003	0	0	11/8/2003	0	0	12/8/2003	3.8	49.6
10/9/2003	0	0	11/9/2003	0	0	12/9/2003	4	73.3
10/10/2003	0	0	11/10/2003	0	0	12/10/2003	3.3	142.1
10/11/2003	0	0	11/11/2003	0	0	12/11/2003	4.7	104.1
10/12/2003	3.8	114.8	11/12/2003	0	0	12/12/2003	4.2	81.6
10/13/2003	0	0	11/13/2003	0	0	12/13/2003	0	0
10/14/2003	11.9	121.8	11/14/2003	0	0	12/14/2003	0	0
10/15/2003	0	0	11/15/2003	0	0	12/15/2003	3.5	46.7
10/16/2003	0	0	11/16/2003	0	0	12/16/2003	0	0
10/17/2003	4.1	100.4	11/17/2003	0	0	12/17/2003	3.6	43.4
10/18/2003	3.5	69.8	11/18/2003	0	0	12/18/2003	0	0
10/19/2003	3.2	86.5	11/19/2003	131.9	310.8	12/19/2003	0	0
10/20/2003	3.2	74.2	11/20/2003	0	0	12/20/2003	0	0
10/21/2003	3.1	85	11/21/2003	0	0	12/21/2003	0	0
10/22/2003	3.3	51.7	11/22/2003	0	0	12/22/2003	0	0
10/23/2003	0	0	11/23/2003	0	0	12/23/2003	0	0
10/24/2003	3.4	55	11/24/2003	62.5	310.7	12/24/2003	0	0
10/25/2003	3.9	93.3	11/25/2003	3.6	44.7	12/25/2003	0	0
10/26/2003	0	0	11/26/2003	0	0	12/26/2003	0	0
10/27/2003	3.3	87.6	11/27/2003	0	0	12/27/2003	0	0
10/28/2003	4.1	102.2	11/28/2003	0	0	12/28/2003	6.3	57.5
10/29/2003	0	0	11/29/2003	0	0	12/29/2003	7.6	95.1
10/30/2003	0	0	11/30/2003	0	0	12/30/2003	0	0
10/31/2003	0	0				12/31/2003	0	0
	Total:	**1418.9**			**826.5**			**754.4**

	Unit 4 NOx @ 15%(PPM)	Unit 4 Nox(#/HR)
10/1/2003	0	0
10/2/2003	0	0
10/3/2003	0	0
10/4/2003	0	0
10/5/2003	0	0
10/6/2003	4.4	100.1
10/7/2003	3.8	118.7
10/8/2003	0	0
10/9/2003	0	0
10/10/2003	0	0
10/11/2003	0	0
10/12/2003	3.7	107.8
10/13/2003	0	0
10/14/2003	3.7	95.7
10/15/2003	0	0
10/16/2003	0	0
10/17/2003	9.2	124.6
10/18/2003	4.7	65
10/19/2003	3.3	71.9
10/20/2003	3.4	77.7
10/21/2003	2.9	70.1
10/22/2003	3.1	36.8
10/23/2003	0	0
10/24/2003	6.1	54.6
10/25/2003	3.5	61.5
10/26/2003	3.6	48
10/27/2003	3.2	73.7
10/28/2003	3.3	79.6
10/29/2003	0	0
10/30/2003	0	0
10/31/2003	0	0
	Total:	**1185.8**

	Unit 4 NOx @ 15%(PPM)	Unit 4 Nox(#/HR)
11/1/2003	0	0
11/2/2003	0	0
11/3/2003	7.6	44.4
11/4/2003	3.8	45.9
11/5/2003	0	0
11/6/2003	0	0
11/7/2003	4.4	29.5
11/8/2003	0	0
11/9/2003	0	0
11/10/2003	0	0
11/11/2003	0	0
11/12/2003	0	0
11/13/2003	0	0
11/14/2003	0	0
11/15/2003	0	0
11/16/2003	0	0
11/17/2003	0	0
11/18/2003	0	0
11/19/2003	10.9	86.1
11/20/2003	0	0
11/21/2003	0	0
11/22/2003	0	0
11/23/2003	0	0
11/24/2003	6.3	62.1
11/25/2003	5.5	50
11/26/2003	0	0
11/27/2003	0	0
11/28/2003	0	0
11/29/2003	0	0
11/30/2003	0	0
		318

	Unit 4 NOx @ 15%(PPM)	Unit 4 Nox(#/HR)
12/1/2003	5.4	38.5
12/2/2003	0	0
12/3/2003	0	0
12/4/2003	0	0
12/5/2003	0	0
12/6/2003	0	0
12/7/2003	0	0
12/8/2003	4.3	43.7
12/9/2003	4.4	36.6
12/10/2003	3.4	108.3
12/11/2003	3.7	57.1
12/12/2003	4.8	51.4
12/13/2003	0	0
12/14/2003	5.2	38.7
12/15/2003	3.1	34.1
12/16/2003	0	0
12/17/2003	4.1	28.5
12/18/2003	0	0
12/19/2003	0	0
12/20/2003	0	0
12/21/2003	0	0
12/22/2003	0	0
12/23/2003	0	0
12/24/2003	0	0
12/25/2003	0	0
12/26/2003	0	0
12/27/2003	0	0
12/28/2003	5.8	57.5
12/29/2003	21.8	165.4
12/30/2003	0	0
12/31/2003	0	0
		659.8

NH3

	CTG #1	CTG #2	CTG #3	CTG #4
10/1/2003	7.114925	0	9.223691	0
10/2/2003	0	0	0	0
10/3/2003	0	0	0	0
10/4/2003	0	0	0	0
10/5/2003	0	0	0	0
10/6/2003	13.36652	8.222665	15.27274	13.50409
10/7/2003	11.0262	6.395897	9.194407	9.142953
10/8/2003	0	0	0	0
10/9/2003	0	0	0	0
10/10/2003	0	0	0	0
10/11/2003	0	0	0	0
10/12/2003	0	9.420482	19.88536	15.63645
10/13/2003	0	0	0	0
10/14/2003	13.11442	6.930461	11.86547	14.283
10/15/2003	0	0	0	0
10/16/2003	0	0	0	0
10/17/2003	13.66221	8.742622	10.34846	4.134239
10/18/2003	5.238657	4.201269	4.180685	4.138315
10/19/2003	11.26531	10.42553	12.82882	10.89086
10/20/2003	13.09279	10.09057	10.38671	10.68449
10/21/2003	14.53689	11.82904	13.05991	12.7082
10/22/2003	7.257188	2.858495	5.108551	4.902996
10/23/2003	0	0	0	0
10/24/2003	8.286539	2.350649	4.394595	4.762404
10/25/2003	8.456288	6.195885	5.452986	7.344028
10/26/2003	12.13047	0	0	6.168624
10/27/2003	11.13629	0	12.75992	11.37696
10/28/2003	14.15584	0	11.68303	11.6878
10/29/2003	4.043847	3.87118	0	0
10/30/2003	0	0	0	0
10/31/2003	0	0	0	0
Total	**167.8844**	**91.53474**	**155.6453**	**141.3654**

11/1/2003	0	0	0	0
11/2/2003	0	0	0	0
11/3/2003	4.896027	4.338405	4.465307	3.802944
11/4/2003	4.460116	3.316526	5.677974	5.600437
11/5/2003	0	0	0	0
11/6/2003	0	0	0	0
11/7/2003	4.570479	4.465868	4.486997	4.483871
11/8/2003	0	0	0	0
11/9/2003	0	0	0	0
11/10/2003	0	0	0	0
11/11/2003	0	0	0	0
11/12/2003	0	0	0	0
11/13/2003	0	0	0	0
11/14/2003	0	0	0	0
11/15/2003	0	0	0	0
11/16/2003	0	0	0	0
11/17/2003	0	0	0	0
11/18/2003	0	0	0	0
11/19/2003	5.231502	0	0.66867	5.827313
11/20/2003	0	0	0	0
11/21/2003	0	0	0	0
11/22/2003	0	0	0	0
11/23/2003	0	4.208349	0	0
11/24/2003	4.688157	7.804034	3.426825	6.695902
11/25/2003	6.252475	0	5.117863	4.832113
11/26/2003	0	0	0	0
11/27/2003	0	0	0	0
11/28/2003	0	0	0	0
11/29/2003	0	0	0	0
11/30/2003	0	0	0	0
Total	**30.09876**	**24.13318**	**23.84364**	**31.24258**

12/1/2003	3.169151	3.698029	4.692355	4.17248
12/2/2003	0	0	0	0
12/3/2003	0	0	0	0
12/4/2003	0	0	0	0
12/5/2003	0	0	0	0
12/6/2003	0	0	0	0
12/7/2003	0	0	0	0
12/8/2003	4.542896	3.286541	4.346071	4.177384
12/9/2003	9.548929	9.054674	10.48473	5.179862
12/10/2003	10.22115	11.47739	14.64135	10.29782
12/11/2003	4.784019	3.831023	4.053073	3.730693
12/12/2003	7.529619	3.776507	7.981672	3.806014
12/13/2003	0	0	0	0
12/14/2003	0	2.864599	0	2.932564
12/15/2003	4.144811	0	4.589455	3.687943
12/16/2003	0	0	0	0
12/17/2003	1.969296	1.959679	3.457178	1.913045
12/18/2003	0	0	0	0
12/19/2003	0	0	0	0
12/20/2003	0	0	0	0
12/21/2003	0	0	0	0
12/22/2003	0	0	0	0
12/23/2003	0	0	0	0
12/24/2003	0	0	0	0
12/25/2003	0	0	0	0
12/26/2003	0	0	0	0
12/27/2003	0	0	0	0
12/28/2003	4.833254	4.668063	6.503371	5.398721
12/29/2003	9.372846	5.788047	5.740848	5.531304
12/30/2003	0	0	0	0
12/31/2003	0	0	0	0
Total	**60.11597**	**50.40455**	**66.49009**	**50.82783**
4th Qtr Tot	**258.0991**	**166.0725**	**245.9791**	**223.4358**

ATTACHMENT BIO-2

Nitrogen Deposition Study

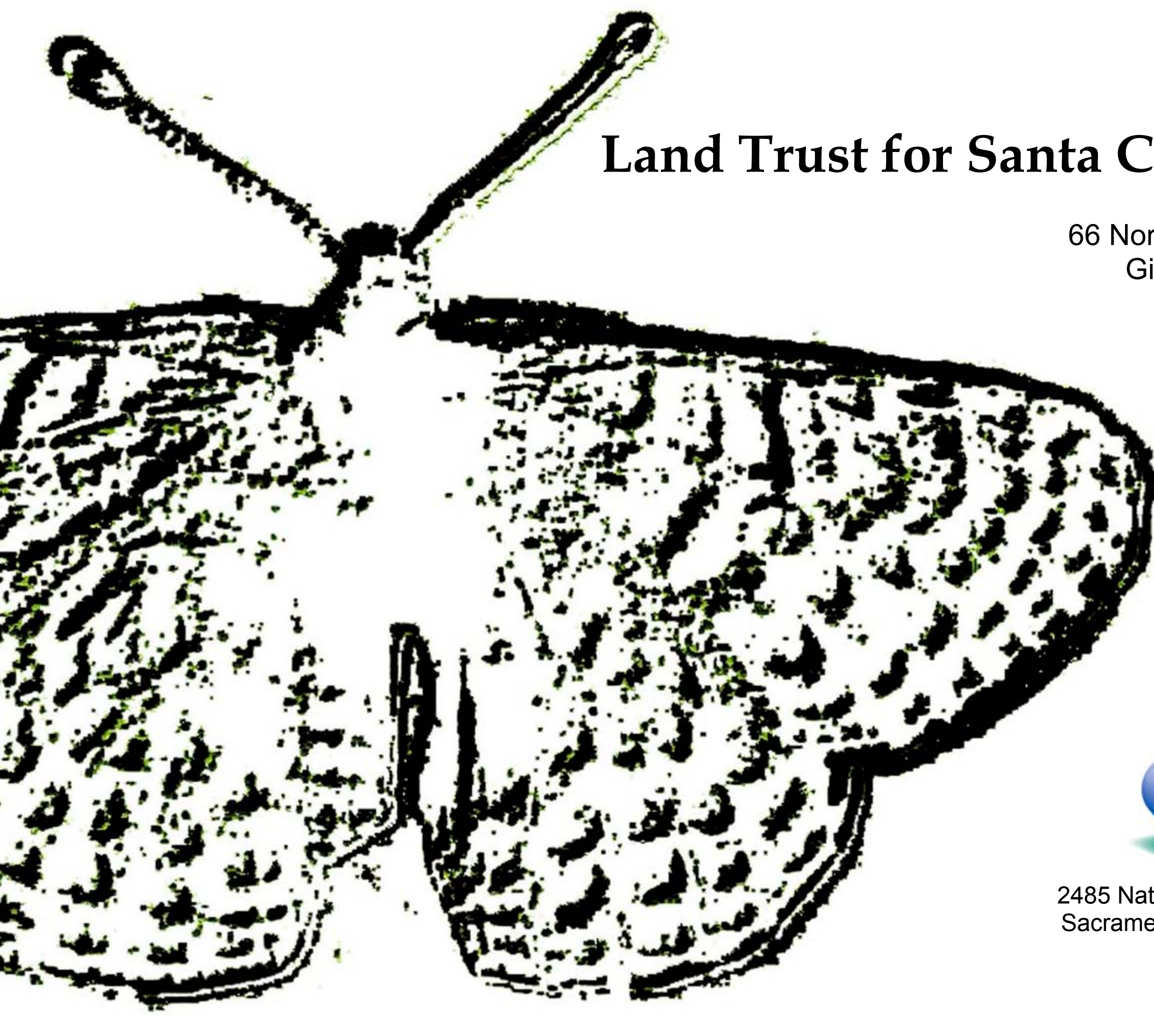
Chapter 4 from:

Year 2-Initial Baseline Monitoring, Annual Monitoring Report for the Metcalf Energy Center Ecological Preserve, Santa Clara County, California

Year 2-Initial Baseline Monitoring

ANNUAL MONITORING REPORT FOR THE METCALF ENERGY CENTER ECOLOGICAL PRESERVE

SANTA CLARA COUNTY, CALIFORNIA



Prepared for

Land Trust for Santa Clara County

66 North First Street, Suite 2
Gilroy, California 95022

March 2004

Prepared by

CH2MHILL

2485 Natomas Park Drive Suite 600
Sacramento, California 95833-2937

March 2004

Contents

4.0 Nitrogen Deposition Monitoring

Fuel burning sources such as combustion vehicles and natural gas power plants produce airborne exhaust containing nitric oxide (NO_x) gas. Control of NO_x emissions by catalytic converters can also release ammonia gas (NH_3). These gases are a major component of smog. Both NO_x and NH_3 undergo further reactions and form nitric acid vapor (HNO_3), ammonium nitrate particulates (NH_4NO_3), and mediate ozone (O_3) production. These various nitrogen species dry deposit onto surfaces, as well as dissolve in rain and fog, and can add substantial amounts of N to serpentine soils (Weiss 1999).

Serpentine soils are characteristically low in nitrogen and thus nutrient deficient for the growth of most plant species. Species associated with serpentine habitat are more suited to low nitrogen levels. Nutrient amendment in the form of nitrogen deposition can have a significant impact on vegetative species composition. The deposition can further encourage the growth and spread of non-native grasses that compete for space with native species such as BCB host and nectar plants (Weiss 1999).

The Resource Management Plan for the MEC Ecological Preserve includes plans to measure the nitrogen deposition in the Preserve and other nearby serpentine grassland sites. In south San Jose, where the Metcalf Energy Center is located, there are high background levels of nitrogen compounds in the air. In particular, the nitrogen dioxide and nitric oxide compounds (NO_x) can be seen on many days as the brown haze that sits over the Santa Clara Valley. Concentrations of NO_x, NH_3, and other gases are being measured within the Preserve; in other serpentine habitat within the vicinity; along a nearby highway; and a relatively “clean air” site to establish a pre-MEC operation baseline (Figure 4-2). Once the MEC is on-line and operating, the incremental contribution of NO_x and NH_3 from the power plant will be estimated using the pre-operation baseline.

4.1 Equipment and Process

Passive monitoring samplers from Ogawa & Co., Inc. are being used to measure concentrations of key reactive nitrogen gases (Figures 4-1 through 4-3). The passive monitors use specially treated filters to collect specific compounds in the air throughout the year. When analyzed, the filters provide average concentrations of specific compounds over the period the monitor was deployed.

Figure 4-1. Ogawa Passive Sampler

Passive Sampling

The nitrogen deposition monitoring program includes measurements of four nitrogen compounds: NOx, NO_2, NH_3, and HNO_3. The difference between total NOx and NO_2 can be used to calculate NO concentrations. The HNO_3 levels are measured with a monitoring device custom-designed by Dr. Andrjez Bytnerowicz to only capture the highly reactive HNO_3. Ozone (O_3) is also measured due to its effects on the conversion of nitrogen compounds.

Deployment of the samplers and analysis of the filters is simple and inexpensive. The samplers cost $60 each and are reusable. Each sampler uses two filters at $2.80 each and each filter costs $6 to analyze. With five compounds being sampled, the cost per sampler site is just $88 per period. The passive samplers are quickly exchanged from the shelters on a monthly basis as shown below.

Figure 4-2. Nitrogen Passive Monitoring Sampler

Figure 4-3. Exchanging Monitoring Filters

4.2 Project Status as of January 15, 2004

In March, 2002, Dr. Bytnerowicz toured the sites with Dr. Stuart Weiss to assess the locations of air monitors and finalize the project plans. Dr. Bytnerowicz is an expert on nitrogen monitoring and deposition from the USDA Forest Service, Pacific Southwest Research Station and is assisting the project with his extensive experience.

Dr. Bytnerowicz is also performing the filter analyses at his laboratory in Riverside, California.

In May 2002, approval was granted by the Bay Area Air Quality Management District (BAAQMD) to co-locate a passive monitoring installation at their Redwood City facility. By co-locating one of the passive monitoring stations at a BAAQMD facility that actively monitors NO_2, NO and O_3, we are able to correlate the passive measurement to the active BAAQMD measurements over the same periods. When the BAAQMD re-established their facility in San Jose in December 2003, another passive monitoring station was co-located there for additional calibration.

The following eight passive monitoring stations were established in early July, 2002 (Fig 4-4, from North to South).

1. TH - Tulare Hill – Top of the hill behind MEC on fence line.
2. KC-High - Top of Coyote Ridge – just S of MEC-CR preserve, elev ~330m.
3. KC-low Bottom of Coyote Ridge, elev ~70 m.
4. RCAQ - BAAQMD air quality monitoring facility in Redwood City.
5. JR - Jasper Ridge Biological Preserve, Stanford University – The "clean air' site.
6. EW-west - Edgewood Park – Just west of Hwy 280 for freeway experiment.
7. EW-east - Edgewood Park – Just east of Hwy 280 for freeway experiment.
8. EW400e - Edgewood Park – 400 meters east of Hwy 280 for freeway experiment.
9. SJAQ – Near Downtown San Jose at the BAAQMD station, started in December 2002.

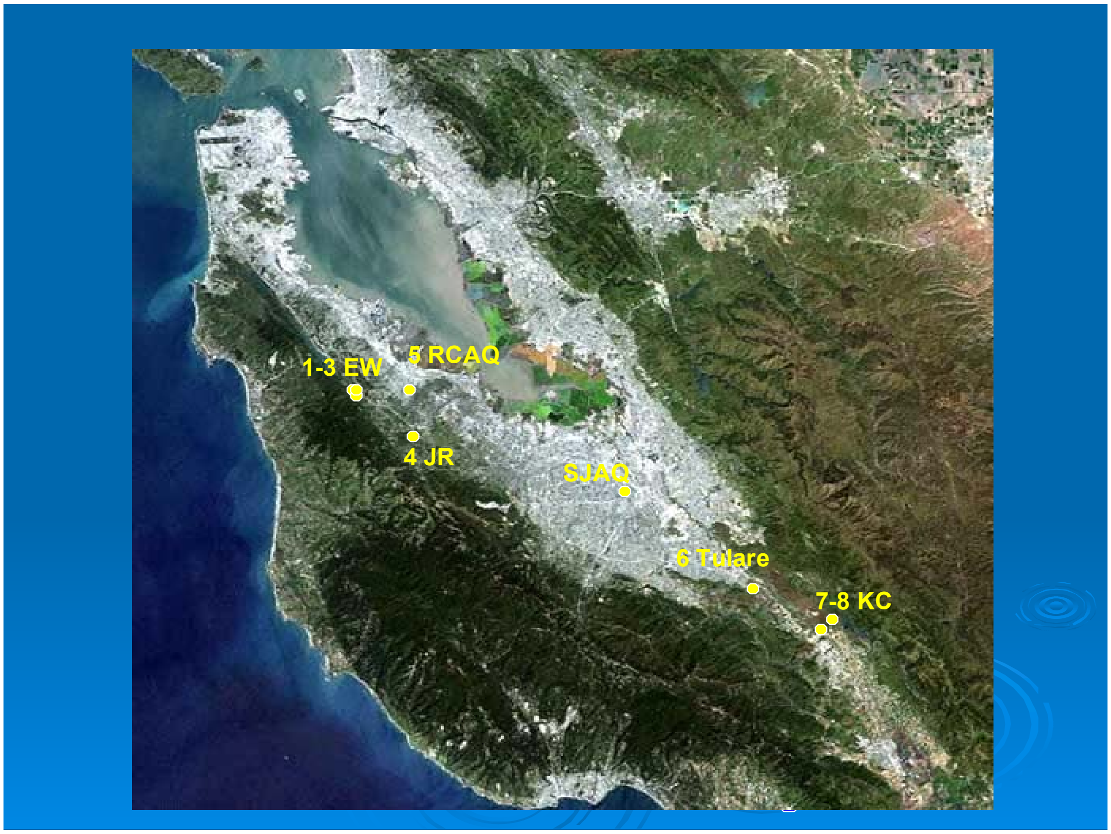


Figure 4-4 Map of N-deposition stations

As of January 2004, data are available for ~monthly periods from July 8, 2002 to October 9, 2003 (Table 4-1, Figures 4-5 through 4-9). Each N-species has its own unique spatial and temporal pattern, depending on its source, chemistry, and monthly meteorology. The following discussion of each compound addresses these factors. Then, a prognosis of the impacts of MEC emissions on the sampling network is discussed in the context of potential regional changes in emission sources.

Table 4-1 Monthly N monitoring periods.

Label	Start	End
Jul	7/8/2002	7/30/2002
Aug	7/30/2002	8/27/2002
Sep	8/27/2002	9/24/2002
Oct	9/24/2002	10/22/2002
Nov	10/22/2002	11/19/2002
Dec	11/19/2002	12/17/2002
Jan	12/17/2002	2/5/2003
Feb	2/5/2003	3/11/2003
Mar-Apr	3/11/2003	4/23/2003
May	4/23/2003	5/27/2003
Jun	5/27/2003	7/1/2003
Jul	7/1/2003	8/7/2003
Aug-Sep	8/7/2003	10/10/03

NH_3 (Figure 4-5)

Monthly NH_3 concentrations varied from undetectable to > 5ppb. The lowest values were at JR and EW400e. The highest average yearly values at EW-east, immediately downwind of I-280, indicating substantial vehicular NH_3 emissions from 100,000 vehicles/day traveling the freeway. Tulare Hill had the highest concentrations in the S. Bay. KC-low had higher concentrations than KC-high, because KC-low is ~200 meters downwind of US 101 (carrying 100,000 vehicles/day) and KC-high is more distant from local sources and often above the inversion layer.

In general, NH_3 levels exhibited a strong seasonal cycle, with higher values in winter (Nov-Feb) than in spring and summer. The relationship between EW-east and EW-west highlights the importance of local sources and wind direction. In spring and summer, prevailing westerly winds drive a large concentration gradient from west to east, but during Nov-Jan, winds had a more easterly component and NH_3 levels were slightly higher at EW-west. The NH_3 disperses upward or deposits on the grassland, and concentrations at EW400m east are only slightly elevated over Peninsula foothills background concentrations at JR.

The major source of NH_3 in the Bay Area appears to be motor vehicles. The introduction of 3-way catalytic converters has greatly increased NH_3 emissions from light-duty vehicles since the early 1990s (Fraser and Cass 1998, Kean et al. 2000, Baum et al. 2002). Agricultural sources such as livestock and fertilizer applications can also account for substantial NH_3 emissions, but locally these are only present in Coyote Valley, south of the MEC site, and are of unknown magnitude.

MEC is expected to emit NH_3 from the SCR units, and will be discussed below.

HNO_3 (Figure 4-6)

Mean monthly HNO_3 concentrations ranged from 0.25 ppb to 5 ppb. HNO_3 exhibits a strong regional gradient from lower concentrations on the Peninsula to high concentrations in the South Bay. HNO_3 takes hours to form, so higher levels are expected kilometers downwind of NO_x source areas. HNO_3 also exhibited a pronounced seasonal cycle, higher in summer and lower in winter, reflecting photochemical and heat-dependent reaction rates. Summertime HNO_3 levels at TH and KC are similar to levels measured in polluted parts of the Los Angeles Basin (Padgett et al. 1999, Bytnerowicz et al. 2001).

NO_2 (Figure 4-7)

Mean monthly concentrations of NO_2 ranged from 2-25 ppb. NO_2 exhibits strong regional and local gradients. The lowest concentrations were at JR and EW400e, and the highest at RCAQ and TH, and KC-low was lower than KC-high. NO_2 has a pronounced seasonal cycle, higher in winter than in summer.

NO (Figure 4-8)

Mean monthly concentrations of NO ranged from 1-35 ppb. NO has spatial and temporal patterns similar to NH_3, not surprising because they are both primary vehicular tailpipe emissions.

O_3 (Figure 4-9)

Mean monthly concentrations of O_3 ranged from 9-45 ppb. The site with the lowest concentrations was RCAQ, where titration from NO reduces O_3 concentrations. KC-high had the highest concentrations – like HNO_3, O_3 takes time to form and higher levels are expected downwind of NO_x and VOC sources. One ozone spike was detected at TH in September.

Composition of reactive N in gaseous species (Figure 4-10)

NO_2 provides the highest amount of reactive N at nearly all sites, ranging from 4-10 ug-N/m^3. NO-N is second in abundance, and is higher only at roadside sites at EW. NH_3-N is third in abundance, with highest values at roadside sites and at TH. HNO_3-N is the lowest, with a clear Peninsula-South Bay gradient.

Deposition

A first-order deposition model was built for inter-site comparisons. Dry N-deposition is a well established phenomenon, but is a complex process that is difficult to measure and model. Despite the complexities in determining surface resistances of multiple gases for multiple surface and weather conditions, atmospheric concentrations are first-order drivers of dry deposition fluxes. Relative comparisons between sites with the same habitat -- low biomass annual grassland in a Mediterranean climate with a cool wet season (Nov-Apr) and a warm dry season (May-Oct.) -- based on concentration data are robust even if deposition velocities are approximate.

The deposition velocities were taken from several literature sources (Krupa 2003, Smith et. al 2000, Sienfeld and Pandis 1998). Deposition velocities varied between dry season and wet season conditions (Table 4-2). HNO_3 deposition velocity shows no seasonal difference, because surface resistance is negligible for the highly "sticky" species; the 16 mm/s velocity is very close to the aerodynamic resistance for grassland (Sienfeld and Pandis 1998). NH_3 deposition velocity is similar to HNO_3 during the wet season – moist surfaces and active plants are very efficient at taking up NH_3. Dry season values are lower, but still substantial because residual moisture is present even at typical summertime relative humidity. NO_2 uptake is only through stomata, and the low values for wet season reflect the low leaf area of the serpentine grassland. Dry season values are even lower.

NO does not effectively deposit on soils or through stomata, and has a very low deposition velocity that eliminates NO as a substantial contributor to deposition. Note that particulate NH_4^+ and NO_3^- deposition are not considered, nor is wet deposition (each of these contributes on the order of 1 kg-N ha^{-1} year^{-1}) (Blanchard et al. 1996).

Estimated annual dry deposition from the three major gaseous species ranged from 4 kg-N ha^{-1} at JR to 17 kg-N ha^{-1} at TH. The major differences among sites are driven by NH_3 and HNO_3. TH receives substantial deposition from NH_3 (8.3 kg-N ha^{-1}), HNO_3 (4.5) and NO_2 (4). KC-low receives 15 kg-N ha^{-1}, similar proportions to TH, with slightly less NH_3. KC-high receives less NH_3 and NO_2 deposition than the lower elevation sites.

Deposition at the freeway sites at Edgewood are dominated by NH_3, and falls within the range observed at Tulare Hill and Kirby Canyon, sites where grass invasions have been documented or are ongoing. However, the effect appears to be highly localized in the absence of regional-scale sources, so that by 400m east, deposition levels have dropped to near-background for rural SF Peninsula sites. *Lolium* invasion patterns follow this pattern (Weiss and Bytnerowicz MS). It is important to note that the N-deposition levels estimated at the "cleanest" site (JR) are 10-20 times the pre-industrial background.

Tulare Hill Prognosis

Tulare Hill is at the downwind end of the urbanized Santa Clara Valley and currently has the highest estimated N-deposition of any site in the network. The summit station on Tulare Hill is WSW of the MEC powerplant, so it will pick up direct stack emissions under limited circumstances when ENE winds occur. Additional increases at the station site may occur during calm periods.

Addition of MEC will likely affect deposition as follows: summertime concentrations of NH_3 and NO_x will not increase by much because prevailing winds will usually carry most of the emissions southeast. Calm periods and infrequent periods of northeasterly winds are the only times when transport to the summit from the stack is likely significant. In winter, a higher frequency of easterly winds and calm periods may lead to increased concentrations of NH_3 and NO_x at the summit. Because the station is so close to the plant, no increases in HNO_3 are expected.

Parts of Tulare Hill will likely receive more deposition from MEC emissions, particularly the areas NW of the powerplant. SE winds are most common in winter, and the plume will directly intercept the habitat. Placement of additional stations for NH_3, NO_x, and NO_2 at various points on Tulare Hill would be necessary to capture the fine-scale spatial patterns of MEC emissions on Tulare Hill, as would close examination of the model results from the CEC environmental documentation and new dispersion modeling.

Because of plume dispersion, there is not expected to be a measurable increase in NO_x or NH_3 at KC-low or KC-high that could be directly traced to MEC operations. Areas near Metcalf Road are expected to see incremental increases in deposition from MEC operations, but the signal may be difficult to detect by passive sampling, as discussed below.

Regional Context

In order to understand the meaning of the baseline data presented here, and potential changes in deposition from MEC operation, it is necessary to consider some projections of future regional and local emission trends. At this point, most consideration will be qualitative, as extensive modeling and assessment is beyond the scope of this project.

On a regional basis, NO_x emissions in Santa Clara County were projected to be 103 tons/day in 2005, and drop to 85 tons/day in 2010 (CARB 2001). This should lead to reductions in NO_2 and HNO_3 concentrations across nearly all sites. The regional trend in NH_3 levels may be the opposite direction, as more vehicles equipped with three way catalysts enter the fleet.

Regional trends may be effectively cancelled by local factors. Recently, US 101 was widened from 4 to 8 lanes, and traffic speeds increased dramatically from 30 mph to >70 mph (S.J. Mercury News May 20, 2003, SBW personal observation). Effects on emissions are complex, NO_x/mile increases rapidly at speeds higher than 55 mph (CALTRANS 2000). NH_3 emissions are less well characterized, but high engine loads and fuel-rich running conditions, typical of high speed travel, are implicated in several studies. The KC-low site should be the most affected, as it lies ~200m SE of US 101. A longer time-series at KC-low relative to the other sites in the network is necessary to test the effects of freeway widening. The effect may be muted at KC-high because of distance and elevation, and the effect on Tulare Hill should also be muted because of directional effects (Highway 101 is east of Tulare Hill) similar to the MEC plume discussed above.

The planned build-out of Coyote Valley will eventually provide a diffuse NO_x and NH_3 source area from traffic that will contribute to reactive N concentrations at Tulare Hill and the KC sites. Nearly all portions of Tulare Hill will then receive elevated deposition, because the urban source areas will extend across all southerly directions, and Santa Teresa Blvd will carry increased traffic along the W and SW side of Tulare Hill. The magnitude of the tradeoff between agricultural emissions and urban emissions, especially NH_3, is an uncertainty.

Initial NH_3 emissions from MEC will likely be low because new SCR units have minimal NH_3 slip. Over several years as the catalysts age, NH_3 slip increases to a point where the catalysts are replaced. The impact analysis was based on a maximum of 10 ppm NH_3 in stack gases, actual emissions will be lower if the SCR system is properly maintained.

4.3 Conclusions

The passive sampling network has revealed many interesting patterns of reactive nitrogen gases that are consistent with source locations, and atmospheric chemistry and physics. The technology is cost-effective and provides robust data.

Tulare Hill has the highest estimated deposition among sites in the network. The relative contribution of reactive N-gases to deposition varies among sites. Heavily traveled freeways are a significant local source of NH_3 as well as NO_x. MEC operations will only affect the summit station on Tulare Hill under quite narrow meteorological conditions. Future changes in gas concentrations and deposition, from MEC operation, local urban development, emission controls, and other factors are difficult to predict without quantitative modeling.

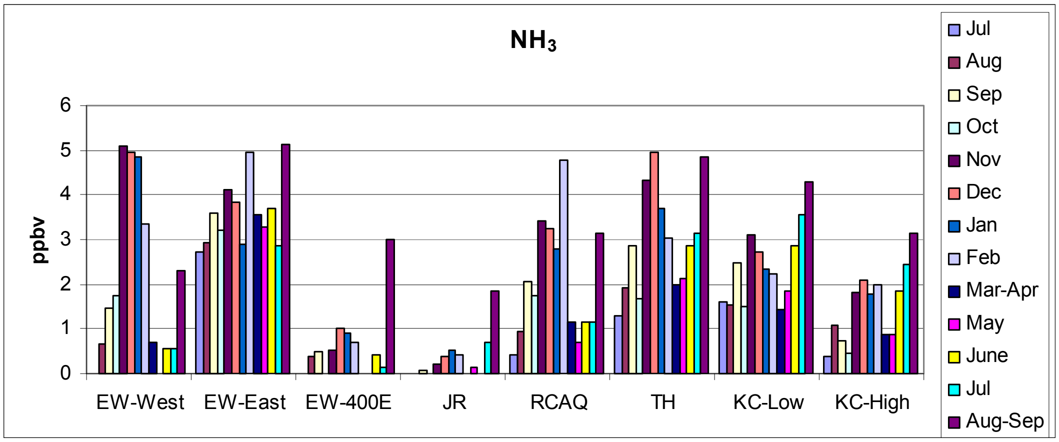


Figure 4-5 Monthly averages of ammonia (NH_3) concentrations, July 8 2002 - Oct 9, 2003

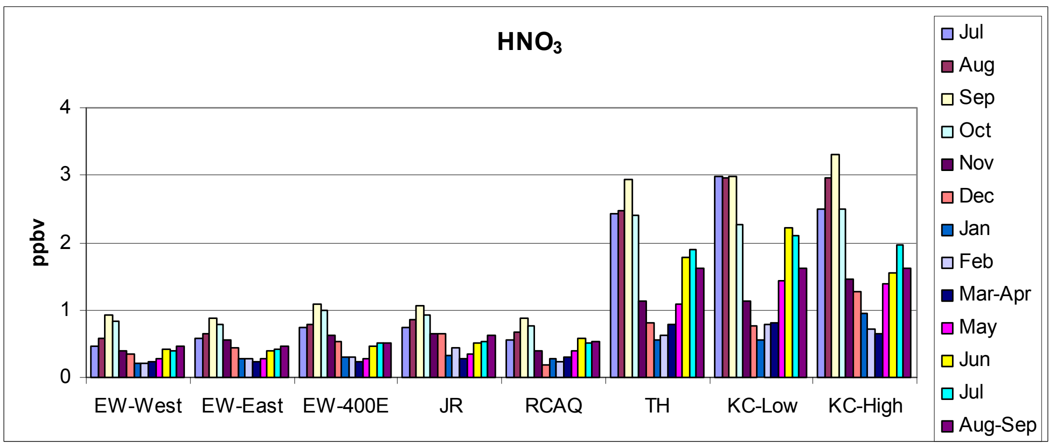


Figure 4-6 Monthly averages of nitric acid (HNO_3) concentrations

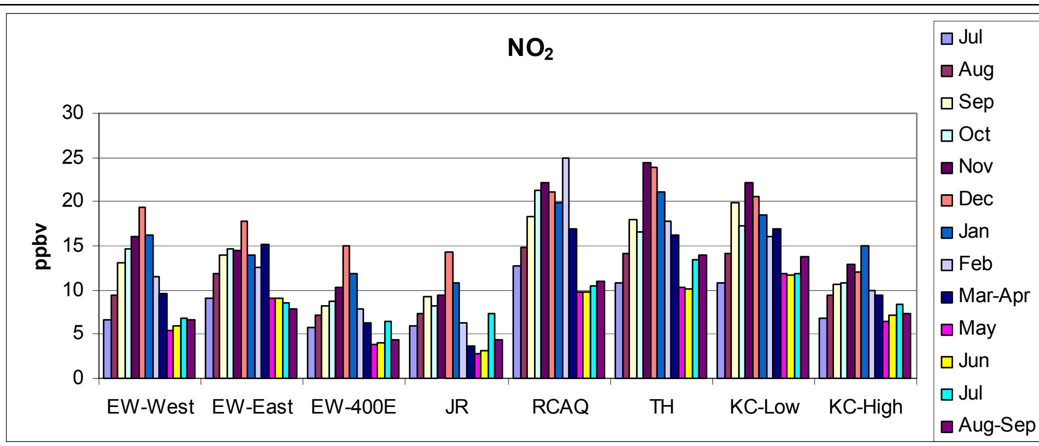


Figure 4-7 Monthly averages of ammonia (NH_3) concentrations

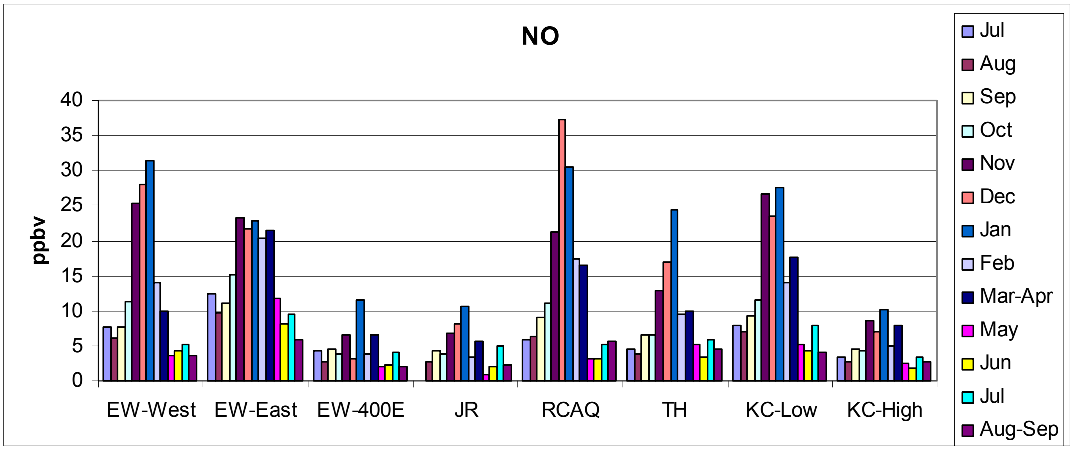


Figure 4-8 Monthly averages of nitric oxide (NO) concentrations

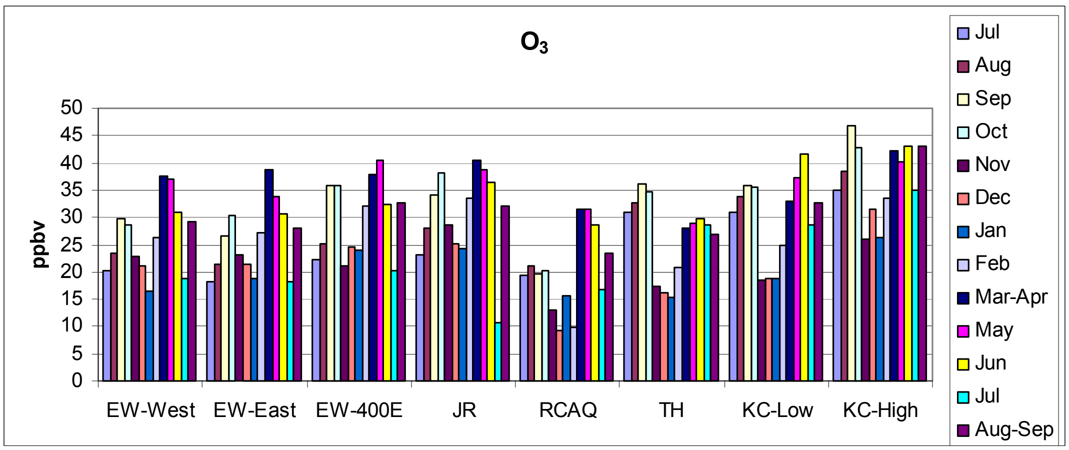


Figure 4-9 Monthly averages of ozone (O_3) concentrations

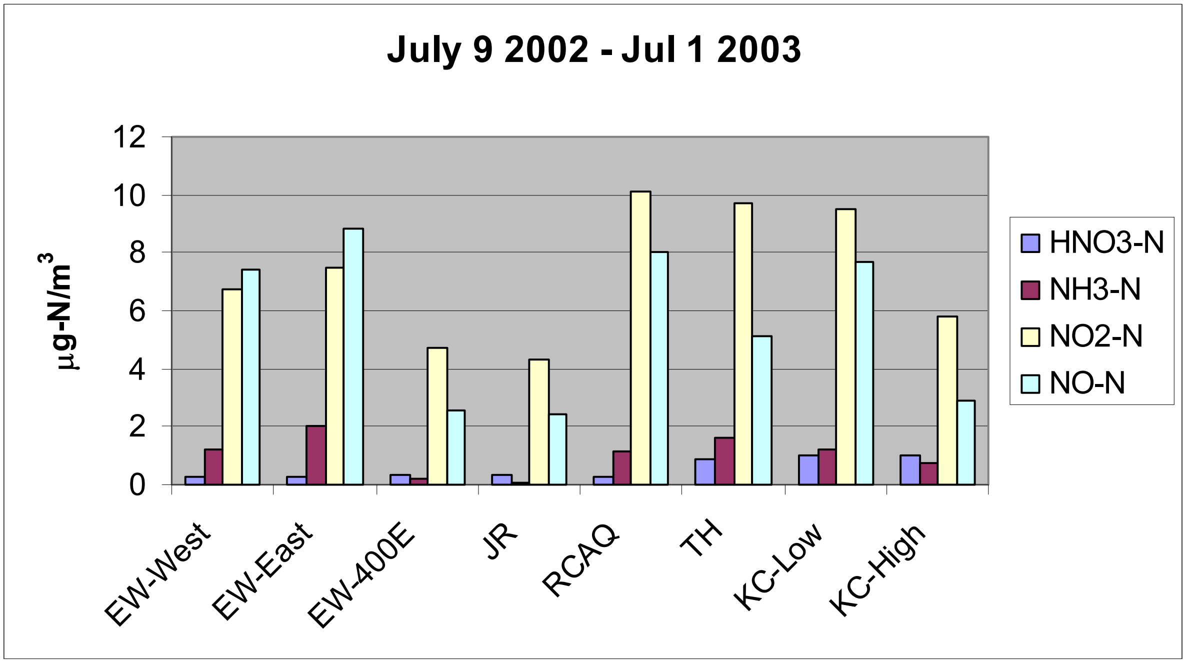


Figure 4-10 Yearly averages of N-content by gas species

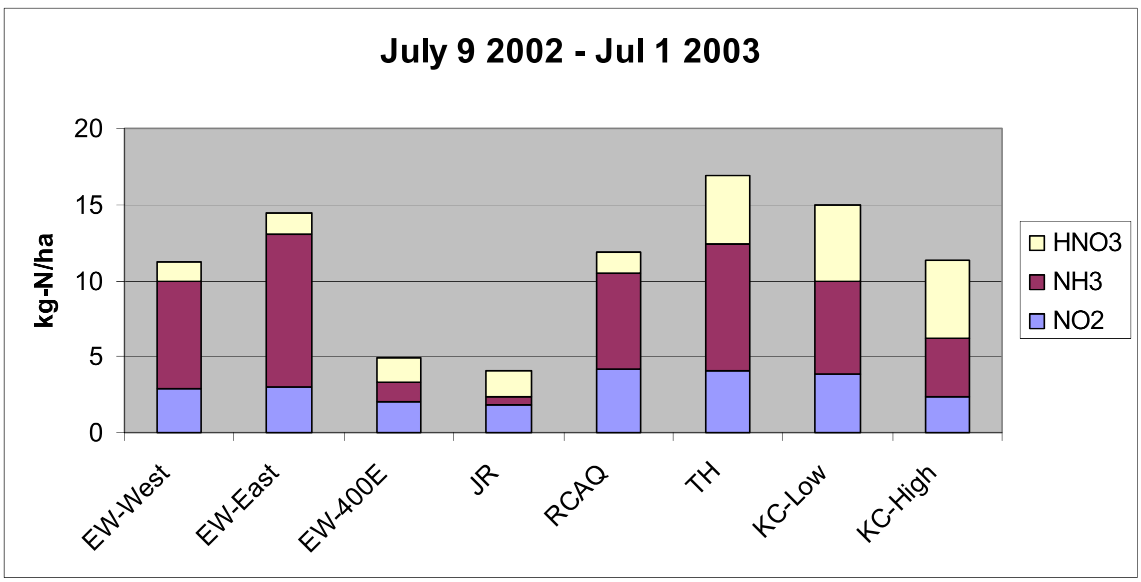


Figure 4-11 Estimated deposition at network sites

Table 4-2 Deposition velocities during dry season and wet season conditions.

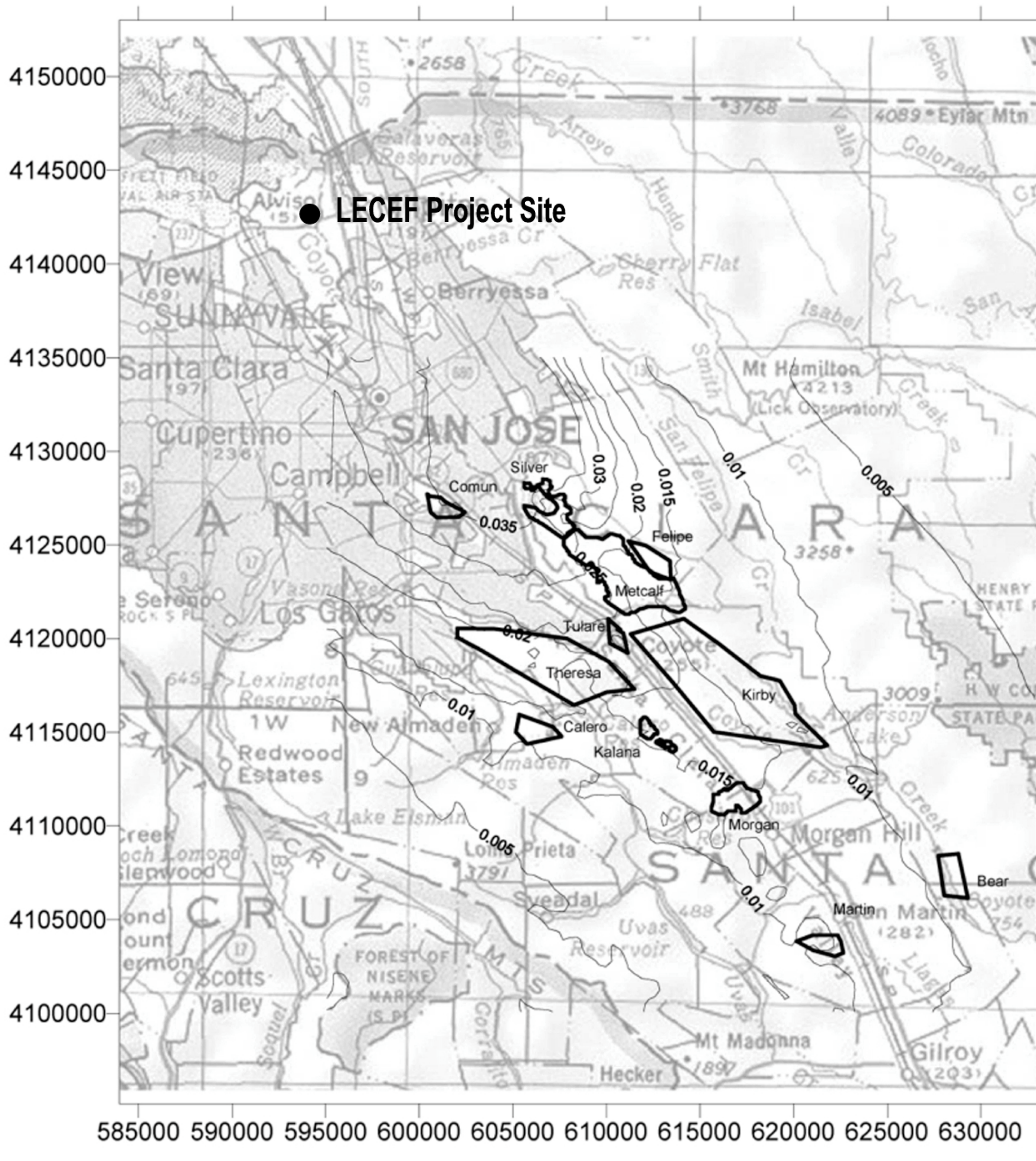
Species	Vd wet (Nov-Apr)	Vd dry (May-Oct)
HNO_3	16 mm/s	16 mm/s
NH_3	16 mm/s	10 mm/s
NO_2	2 mm/s	0.5 mm/s

ATTACHMENT BIO-3

Figure DR21-1

Nitrogen Deposition Isopleth Map

Figure DR21-1
Los Esteros Critical Energy Facility
Nitrogen Deposition for Phase 2



Technical Area: Cultural Resources (30-33)

Cultural Report

30. Please provide a copy of the report required under CUL-9 of the Conditions of Certification documenting all of the cultural resources activities that were conducted for the project (both at the project site and the project linears). Note: reports need to be in the format recommended by the California Office of Historic Preservation's 1990 guidelines - Archaeological Resource Management Reports (ARMR).

Response: The report required under Condition CUL-9 for Phase 1 was filed at the Commission on March 29, 2004.

Survey Report

31. If any areas of the project or linears have not been surveyed within the last five years, please provide a current archeological survey report in the format recommended by the California Office of Historic Preservation's 1990 guidelines - Archaeological Resource Management Reports (ARMR).

Response: There are no parts of the project Area of Potential Effects that have not been surveyed within the past 5 years.

Newly Discovered Resources

32. For all discovered resources or newly identified resources, please provide a recommendation of the eligibility of the resource for the California Register of Historic Resources under CEQA Section 15064.5, (a), (3), (A),(B),(C) & (D) in the above report.

Response: There are no newly discovered resources.

County Ordinance B6-18

33. a. If the City of San Jose's General Plan incorporates Santa Clara County Ordinance B6-18, please provide a copy of that portion of the City of San Jose's General Plan that incorporates the ordinance.

Response: The City's General Plan does not incorporate Santa Clara County Ordinance B6-18.

Contact Information

b In accordance with Santa Clara County Ordinance B6-18 through B6-23 please provide the name and phone numbers of the County Coroner, the County Engineer, and the county coordinator of Indian affairs.

Response: The Santa Clara County Administrative Coroner is Diana Hunter (408-793-1900). The Historic Heritage Commission's Program Manager is Dana Peak (408-299-5798). The Developmental Services Department telephone number is 408-299-5730.

Technical Area: Land Use (34-35)

Rezoning Process

34. Please provide a timeline for the rezoning process and identify the various steps involved.

Response: On March 26, 2004, Applicant submitted a Preliminary Review Questionnaire and accompanying materials to the City of San Jose Department of Planning, Building and Code Enforcement. In submitting this document to the City, Applicant requested a multi-departmental comprehensive review (including a site check, inter departmental coordination and a review by the Department of Public Works) of Applicant's Draft Planned Development Zoning and Planned Development Permit applications. On April 22, 2004 Applicant (Rick Tetzloff, Project Manager, Gregg Wheatland, Applicant's licensing attorney, and Steve De Young, Environmental Manager) spoke with Mike Mena (Project Manager, Plan Implementation Division (telephone: 408-277-8566) who is with the City of San Jose Department of Planning, Building and Code Enforcement, regarding the status of the City's review of the Applicant's Preliminary Review Questionnaire. Mr. Mena indicated that few if any issues have come up with regard to the Preliminary Review Questionnaire. Mr. Mena further indicated that the action to be taken by the City is a "conforming rezoning." Mr. Mena stated that a conforming rezoning need only go before the City Council and not the Planning Commission and that the process normally takes approximately four months.

CEQA Compliance for PD Zone Amendment

35. Please identify any California Environmental Quality Act (CEQA) documentation related to the rezoning actions that will be required by the City of San Jose.

Response: During the Applicant's meeting with The City of San Jose (described in response to Data Request 34, above, Mr. Mena also discussed the CEQA documentation to be used by the City in processing the conforming rezoning. Applicant indicated to Mr. Mena that Applicant prefers a CEQA process to be conducted by the City rather than linking the conforming zoning CEQA review to the CEC licensing process for this case. Mr. Mena indicated that this process was acceptable to the City and that the City would require completion of a CEQA Initial Study checklist by the Applicant. Mr. Mena further indicated that a conforming rezoning with the City responsible for the CEQA review would likely add approximately one month to the normal four-month process. Based on this discussion, Applicant is moving forward with preparing the CEQA Initial Study checklist. Applicant anticipates submitting the Planned Development Zoning and Planned Development Permit applications and the CEQA Initial Study checklist to the City in early May 2004.

Technical Area: Public Health (36)

Chemical Analysis

36. Please explain why the chemicals identified above were omitted. If any were inadvertently omitted, provide a revised risk assessment and analysis that incorporates those chemicals.

Response: Although the chemicals identified in the data request are not listed in Appendix 8.1-C2 to the AFC, they are discussed in Section 8.1 and in Appendix 8.1-A2. Please see Tables 8.1-A2-6 and 8.1-A2-7 (Appendix 8.1-A2) of the AFC for quantification of these chemicals, with the exception of arsenic. Arsenic was not included in the list and was not analyzed in the most recent water sample analysis because it was not detected in the analysis for Phase 1.

The specific PAHs listed above were included in the modeling runs and in the screening risk assessment. As shown in Table 8.1-A2-6, the PAHs anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h) anthracene, and indeno (1,2,3-cd)pyrene were modeled together as total PAHs. The health risk assessment then applied the cancer unit risk value for benzo(a)pyrene to the modeling result, thereby assuming that all of these PAHs had the same URV, even though the URVs for most of these compounds are a factor of 10 lower than the URV for benzo(a)pyrene. Even using this very conservative assumption regarding risk from PAHs, the potential cancer risk for the project was found to be well below 1 in one million. If each compound had been assessed using its own URV, the cancer risk from the project would have been even lower.

Table 8.1-A2-7 shows that the emissions of toxic air contaminants from both cooling towers are well below the BAAQMD's TAC trigger levels. Because these emissions would be so far below the trigger levels, they are considered insignificant and were not included in the modeling analysis for the screening health risk assessment.

Technical Area: Soils and Water Resources (37-42)

ZLD System

37. *Provide a complete discussion of a ZLD system that will be designed for the Phase 1 and Phase 2 facilities, or provide a complete analysis that shows that a ZLD system (no liquid wastewater discharge from the project, onsite or offsite) is either environmentally undesirable or economically unsound as defined in the Commission's 2003 IEPR. The analysis should include the impacts on water use and waste discharge, economic impacts (capital and operating costs), plant efficiency and output, solid waste disposal and environmental impacts.*

Response: As Background to Data Request #37, the Staff states in part: "The 2003 Integrated Energy Policy Report (IEPR) contains a policy for power plants to use ZLD technologies unless such technologies are shown to be environmentally undesirable or economically unsound."

The purpose of the IEPR, as its title indicates, is to "present policy recommendations based on an in-depth and integrated analysis of the most current and pressing energy issues facing the state" (Public Resources Code Section 25302(b)). The policy recommendations contained in the IEPR are not laws, ordinances, regulations or standards. Instead, various entities are directed to consider the information and analyses contained in the IEPR in carrying out their energy related duties (Public Resources Code Section 25302(f)).

In Section Five of the IEPR ("Stewardship of California's Environment") the Commission presented a discussion of the importance of conserving water and using alternative sources of water supply (IEPR at 37-40). The LECEF, which utilizes recycled water for power plant cooling, is in full compliance with these water conservation policies.

In the final paragraph of the IEPR's discussion of water conservation, the Commission states: "Additionally, as a way to reduce the use of fresh water and to avoid discharges in keeping with the Board's policy, the Energy Commission will require zero-liquid discharge technologies unless such technologies are shown to be 'environmentally undesirable' or 'economically unsound' (IEPR, at 41)."

Despite the Commission's well-intended effort to provide clear policy direction, the new policy recommendation regarding zero-liquid discharge technologies actually raises considerable uncertainty. First, it must be noted that ZLD discharge technologies are intended to reduce discharges and are not intended as a "way to reduce the use of fresh water." That said, the LECEF will use recycled water, not fresh water, so that adding a ZLD system to the project would not result in any reduction of fresh water use.

Second, it is not clear what "Board policies" would mandate the use of ZLD technologies. In a discussion of Resolution 75-58, the IEPR notes that "The Board also lists specific 'discharge prohibitions'" to limit the discharge of blowdown and waste waters from cooling facilities so as to "maintain existing water quality and aquatic environment of the state's water resources." Two prohibitions are listed:

1) "The discharge to land disposal sites of blowdown waters from inland powerplant cooling facilities shall be prohibited except to salt sinks or to lined

facilities approved by the Regional and State Boards for the reception of such wastes.

2) The discharge of wastewaters from once-through inland power plant cooling facilities shall be prohibited unless the discharger can show that such a practice will maintain the existing water quality and aquatic environment of the State's water resources."

The LECEF does not violate either prohibition. The LECEF will not discharge to land and the LECEF has demonstrated that the discharges will maintain existing water quality (LECEF Final Decision, p. 198). The IEPR, unfortunately, contains no discussion or analysis to explain why ZLD technologies should be required for facilities that comply with the discharge policies and prohibitions of Resolution 75-58.

Third, it is not clear why the Commission has adopted an economic feasibility policy for evaluating the use of fresh water with respect to the evaluation of ZLD technologies. The policy recommended by the Commission in the IEPR is that power plants should use ZLD technologies unless such technologies are shown to be environmentally undesirable or economically unsound. This policy, however, was recommended by the Water Board to apply to decisions regarding the use of fresh water by power plants—it was not recommended by the Board to apply to decisions regarding discharge. As noted in Staff Comments on the IEPR, Resolution 75-58 provides that "Where the Board has jurisdiction, *use of fresh inland waters for powerplant cooling* will be approved by the Board only when it is demonstrated that the use of other water supply sources or other methods of cooling would be environmentally undesirable or economically unsound." (Emphasis added) Thus, the economic feasibility policy for evaluating the use of freshwater may not be appropriate to evaluating alternative discharge options. In fact, Resolution 75-58 states under Principle (1) that "the source of powerplant cooling water should come from the following sources in this order of priority…(1) wastewater being discharged to the ocean."

Fourth, the IEPR does not provide guidance regarding how an economic feasibility analysis should be undertaken in this case. The IEPR simply states: "The Energy Commission interprets "environmentally undesirable" to mean the same as having a "significant adverse environmental impact" and "economically unsound" to mean the same as "economically or otherwise infeasible." The IEPR merely notes "'Feasible' is defined under the CEQA as meaning "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social and technological factors" (Cal. Code Regs., tit. 14, § 15365). The Staff Data Request is equally vague. It simply refers back to the IEPR and requests a "complete analysis that shows that a ZLD system (no liquid wastewater discharge from the project, onsite or offsite) is either environmentally undesirable or economically unsound as defined in the Commission's 2003 IEPR."

Fifth, the IEPR also raises uncertainty because it speaks about requiring ZLD technology for power plants that it licenses, without explaining whether this policy is intended to be applicable to new facilities, modified facilities or all existing facilities currently licensed by the Commission. The LECEF is an existing facility with an existing water discharge system that has been approved by the Commission and Regional Water Quality Control Board.

The Applicant believes that the Committee, through an appropriate rulemaking proceeding, should clarify the purpose and implementation of the water discharge policies enunciated in the IEPR, before the Commission attempts to apply these policies in individual siting cases.

However, in the interest of being responsive to the Staff's Data Request 37, the Applicant provides the following information.

LECEF's Water and Wastewater Systems—It is important to understand the uncommon features of LECEF's water and wastewater systems. As described in the AFC Section 8.15, LECEF receives makeup water from the WPCP through the South Bay Water Recycling (SBWR) program. LECEF also discharges wastewater back to the WPCP. Consistent with the IEPR, the makeup water is recycled (reclaimed) water that unless used would be discharged by the WPCP to the South San Francisco Bay.

The WPCP discharges millions of gallons of treated wastewater into the South San Francisco Bay every day. This volume of water, which is not salty, dilutes the salinity of the Bay water. This reduction in salinity affects the ecology of the salt marshes surrounding the Bay and reduces habitat quality for species listed under the Endangered Species Act, such as the clapper rail and salt marsh harvest mouse. As such, the SBWR program encourages the use of recycled water to reduce the amount of wastewater discharged to the South Bay. Therefore, using less recycled water would be counter to the goals of the SBWR program.

A ZLD system is also an economically unsound alternative to the current discharge plan. The standard ZLD system design would consist of brine concentrators with concentrated (high TDS and high TSS) brine discharged to brine crystallizers. The brine crystallizers would consist of additional thermal evaporation modules with a filter press (to accomplish final liquid/solid separation). The following is an economic analysis of this alternative.

ZLD's Impact on Water Use and Waste Discharge—The following table summarizes project water usage and wastewater discharge with and without a ZLD design:

Table DR37-1
LECEF Water Usage With and Without ZLD

Stream	Without ZLD (gpd)	With ZLD (gpd)
Peak reclaimed water usage (PRWU)	3,012,771	2,333,869
Average reclaimed water usage (ARWU)	1,357,251	1,035,441
Peak water discharge (PWD)	681,295	1,575 (sanitary waste only)
Average water discharge (AWD)	323,788	1,575 (sanitary waste only)

As shown in the table, a ZLD system would result in about a 30 percent decrease in recycled water demand and would significantly reduce the amount of wastewater discharged.

Attachment 8.15-S5 in the Application for Certification Data Adequacy Supplement (March 2004) analyzed the effects of the LECEF wastewater discharge on the SBWR program. The analysis concluded with the following major points.

1. The LECEF project concentrates existing salinity, but adds negligible new salinity. Also, it does not appreciably change the relative abundance of specific ions important for irrigation, either in the wastewater or in the overall South Bay Water Recycling (SBWR) water supply.

2. The expected magnitude of salinity impacts to the SBWR water supply from the LECEF project would be minor, and manageable, requiring little or no adjustment in practices by other irrigation or industrial users.
3. The LECEF provides a significant benefit to SBWR, which endeavors to expand its base of customers and overall demand for reclaimed water in the service area.

ZLD's Impact on Solid Waste Disposal—The ZLD system will produce approximately 11 tons of solid waste per day under peak operating conditions and approximately 6.5 tons of solid waste per day under average operating conditions, thus consuming local landfill capacity. This solid waste would require removal offsite by tanker trucks approximately daily during peak operating periods and approximately every other day during average operating conditions.

ZLD's Capital Cost—The following table provides an estimated capital cost for the ZLD system, including required tankage and support equipment. The estimate assumes 2-50% brine concentrators and 2-50% crystallizers. The system would be designed for 300 GPM continuous flow and requires 96 hours of wastewater storage to allow for equipment outages, replacement, and maintenance.

Table DR37-2
Estimated Capital Cost of the ZLD System

Item	Estimated Capital Cost
Brine Concentrators	$4,700,000
Crystallizers	$500,000
Storage Tanks	$905,000
Vapor Compressors	$400,000
PDC and Transformers	$500,000
Structural Steel (BC and Bxtal)	$400,000
Civil and Piping	$1,500,000
Erection	$220,000
Site Prep and Finish	$120,000
CBO	$150,000
Commissioning and Startup	$100,000
GeoTech	$100,000
Engineering Review	$100,000
10% Contingency	$820,000
Total Capital Cost	**$10,515,000**

ZLD's Operating Cost Estimate—ZLD systems require additional O&M staff, chemicals, and electrical power. The following table summarizes the incremental operating costs associated with the ZLD system for both peak and average operating conditions. The costs incurred to operate the ZLD system are in addition to any other O&M costs for the project.

Table DR37-3
Estimated Operational Cost of the ZLD System

Operating Item	Peak Cost ($/Day)	Average Cost ($/Day)
Chemicals	$394	$228
Electrical Power	$1475	$903
Solid Waste Disposal	$498	$292
Additional O&M Staff	$576	$576
Total Additional Operating Cost	$2,944	$1999

ZLD's Impact on Plant Efficiency and Output—If the ZLD system were to operate while the project was online, project output would decrease by approximately 1.5 MW due to the parasitic load associated with the ZLD system. It is also important to note that the ZLD system could be required to continue operating during project outages. Under these circumstances, the project would be required to purchase power from other sources, at significant cost.

Conclusions—For LECEF, a ZLD system would result in approximately a 30 percent decrease in recycled water demand, with no corresponding environmental benefit resulting from this reduction, and a significant decrease in wastewater production, but again with minimal corresponding benefits. Incorporating a ZLD system into the LECEF would significantly increase the facility's solid waste disposal, increase capital and operating costs, and reduce the facility's efficiency and output, thus making the use of a ZLD system at the LECEF economically unsound as a means of reducing the facility's recycled water demand.

Water Demand, Quality, and Discharge

38. *Please provide all calculations, assumption and references used in determining average annual and peak water demands for Phase 1 and Phase 2.*

39. *Please provide all calculations, assumption and references used in estimating discharge water quality for Phase 1.*

40. *Please provide a table estimating the water quality of the various waste water streams and combined discharge to the City sewer system (similar to Table 8.15-2) for average and peak daily discharge from both Phase 1 and Phase 2.*

Response: Average and peak water demands are calculated using thermal data from the Applicant's heat balances for the annual average and summer average maximum ambient air conditions, respectively. The cooling tower cycles are estimated using solubility limits. This data is then combined with psychometric calculators to determine cooling tower evaporation rates and demineralized water demands. The Applicant then estimates plant dispatch under different operating conditions to calculate water balances under average, maximum daily, and other operating scenarios. The total water consumption and wastewater production are calculated using the water balances. In essence, the water balances are the calculations.

The concepts used in the calculations are available from standard chemistry and fluid flow texts. Specifically, the concentration of individual constituents is calculated through standard dilution/concentration ratios. Where a constituent changes in a process (acid feed, for example), the impact of the addition is calculated in molar concentrations and then converted to mg/L equivalents and carried through to the next process, and so on.

To determine worst-case impacts, the calculations use conservatively low cooling tower cycles to estimate the water demand and wastewater production flows (i.e. low cycles produces higher water demand and wastewater production). Similarly, conservatively high cooling tower cycles were used to estimate the PM_{10} emissions and health impacts associated with the drift (i.e. high cycles results in high concentrations of constituents).

Regarding the relative quality of the wastewater remaining unchanged from Phase 1 to Phase 2, the wastewater flow (and thus, quality) is dominated by the cooling tower blowdown and the same solubility limits that applied during Phase 1 also apply to Phase 2. Also, the demineralized water system uses membrane technology for TDS and TSS removal. This technology uses the same mineral solubility criteria as cooling towers. Based on the quality of the recycled water, the cooling tower and demineralized water system are both projected to operate at approximately 4 to 5 cycles of concentration. Wastewater quality is approximately the same from both processes.

The tables attached at the end of this section as Attachment SW-1 provide estimated water quality of the various waste water streams and combined discharge to the City sewer system (similar to Table 8.15-2) for average and peak daily discharge from both Phase 1 and Phase 2. The table showing estimated Phase 1 peak daily discharge water quality supersedes Table 8.15-2 in the AFC. Table 8.15-2 was based on the preliminary water balance from the original Phase 1 AFC, and has been updated for the current water balance.

Erosion Control Plan and SWPPP

41. *Please provide a draft Erosion Control Plan that identifies all proposed measures that will be implemented at various locations of the project during construction and operation of the proposed LECEF Phase 2. The plan must address the plant site, construction laydown area and all ancillary facilities.*

    a) *The draft Erosion Control Plan must identify all proposed permanent and temporary Best Management Practices (BMPs) in written form and depicted on a construction drawing(s) of appropriate scale to be employed to control water and wind related erosion and offsite sedimentation during construction and operation. Please provide specific "as-built" information regarding all Phase 1 features to be used for Phase 2, including the proposed permanent storm water outfall structure to be located in the low-flow channel of Coyote Creek.*

    b) *Any measures necessary to address federal or regional permits (i.e., Nationwide Permits, Streambed Alteration Agreements, or 401 Certification) as required, should be identified.*

    c) *The plan must also identify maintenance and monitoring efforts for all erosion control measures.*

    d) *This plan must address all requirements of the City of San Jose's Grading and Excavation Permit and how the proposed project will comply with these requirements.*

    e) *Please provide representative profiles and cross sections of areas that will be excavated and filled, in relation to the proposed conceptual location of BMP's for erosion control during construction.*

f) *Please provide a discussion of all assumptions, calculations, measures, and any other data or information related to the design of drainage features to be used by Phase 2.*

Response: The Draft Erosion Control Plan is included in the Draft construction Storm Water Pollution Prevention Plan for Phase 2 (Attachment SW-2).

Erosion Control Plan and SWPPP

42. *Please provide a draft Storm Water Pollution Prevention Plan (SWPPP) consistent with the requirements for a General Storm Water Construction Activity Permit for the proposed Phase 2.*
    a) *The draft SWPPP shall identify all permanent and temporary BMPs in written form and depict conceptual locations in order to prevent or avoid contamination of stormwater.*
    b) *The draft plan should also address comments provided by the Regional Water Quality Control Board or other agencies as applicable.*
    c) *Various contaminant sources will be present at the site. Various chemicals used during operation, chemical cleaning and washwater wastes (containing high concentrations of metals) and other contaminants will be stored onsite. Please show possible storage locations at the site and specify appropriate BMPs that will be used to prevent spills or leaks of contaminants and measures to be employed in the event of such an occurrence. Specifically address how stormwater that has come into contact with any contaminated materials will be collected, treated, and discharged.*
    d) *Please discuss the design storm that was used or will be used to calculate additional capacity required in the contained areas surrounding outside chemical storage areas.*
    e) *During construction, it is possible that groundwater will be encountered. Please discuss dewatering activities/techniques that may be needed, including disposal of associated water.*
    f) *Please address how any contaminated soil or groundwater that may be excavated or encountered during construction will be collected, treated, and discharged.*
    g) *If hydrostatic testing will be done, please discuss the anticipated water quality of wastewater discharged, anticipated disposal of this waste stream and any appropriate BMPs to ensure no discharge of contaminants to surface or groundwater will result from hydrostatic testing.*

Response: The Draft Construction Storm Water Pollution Prevention Plan for Phase 2 is attached to this section (Attachment SW-2)

ATTACHMENT SW-1

Water Quality Data Tables

CALPINE

Los Esteros CEF Phase 1 Peak Day[7] Estimated Discharge Water Quality

Constituent	Units	Input to Waste Stream[1]: Filter Backwash	CT Blowdown[3]	RO Concentrate	Process Drains	Combined Waste	Max Allowable Concentration[6]
Flow	GPM	31.27	32.24	31.27	1.05	95.84	
Cations							
Calcium	mg/L	50.30	245.49	251.30	50.30	181.56	-
Magnesium	mg/L	29.50	143.98	147.38	29.50	106.48	-
Manganese	mg/L	0.20	0.98	1.00	0.20	0.72	35.0
Potassium	mg/L	14.60	71.26	72.94	14.60	52.70	-
Sodium	mg/L	165.00	805.30	824.34	165.00	595.56	-
Anions							
Bicarbonate	mg/L	148.00	94.14	739.41	148.00	322.86	-
Chloride	mg/L	243.85	1190.11	1218.25	243.85	880.15	-
Phosphate	mg/L	4.90	23.91	24.48	4.90	17.69	-
Sulfate	mg/L	120.00	1104.67	599.52	120.00	607.75	-
Metals							
Antimony	mg/L	0.001	0.005	0.005	0.001	0.004	5.0
Arsensic	mg/L	0.0013	0.0063	0.0065	0.0013	0.0047	1.0
Beryllium	mg/L	0.001	0.005	0.005	0.001	0.004	0.75
Cadmium	mg/L	0.0009	0.0044	0.0045	0.0009	0.0032	0.7
Chromium	mg/L	0.0008	0.0039	0.0040	0.0008	0.0029	1.0 (0.2)[4]
Copper	mg/L	0.0041	0.0200	0.0205	0.0041	0.0148	0.4 / 1.0 [5]
Lead	mg/L	0.0011	0.0054	0.0055	0.0011	0.0040	0.4
Mercury	mg/L	0.000074	0.000361	0.000370	0.000074	0.000267	0.010
Nickel	mg/L	0.0074	0.0361	0.0370	0.0074	0.0267	0.5 / 1.1 [5]
Selenium	mg/L	0.001	0.005	0.005	0.001	0.004	2.0
Silver	mg/L	0.001	0.005	0.005	0.001	0.004	0.7
Zinc	mg/L	0.049	0.239	0.245	0.049	0.177	2.6 (1.0)[4]
Other							
Cyanide	mg/L	0.005	0.024	0.025	0.005	0.018	0.5
Phenols	mg/L	0.005	0.024	0.025	0.005	0.018	-
SiO2[2]	mg/L	22.07	107.71	110.26	22.07	79.66	-
TSS	mg/L	6.5	11.5	0.1	6.3	6.1	-
TDS	mg/L	810.12	3844.66	4047.33	810.12	2887.36	-
pH	Units	7.20	7.20	7.20	7.20	7.20	-

Notes

1. Estimates based upon average incoming raw water quality data provided by the SBWR and water balance diagram.
2. All silicon assumed to be in the form of SiO2
3. Chemicals used in cooling tower treatment will not contain priority pollutants listed in 40 CFR 423.17
4. 40 CFR 423.17 cooling tower blowdown pretreatment standards for new sources given in parenthesis.
5. SJ/SC WPCP Type 2 Discharger special limits (average annual/average daily concentrations)
6. Maximum Allowable concentration from SJ/SC WPCP waste water discharge application unless otherwise noted.
7. Assumes 12 hours of operation at peak summer ambient conditions and 4 hours of operation at average annual ambient conditions in a 24 hour period (16 hours total operation).

CALPINE

Los Esteros CEF Phase 2 Average Day[7] Estimated Discharge Water Quality

Constituent	Units	Filter Backwash	CT Blowdown[3]	RO Concentrate	Process Drains	Combined Waste	Max Allowable Concentration[6]
		Input to Waste Stream[1]					
Flow	GPM	64.34	185.86	51.47	5.00	306.68	
Cations							
Calcium	mg/L	50.30	248.63	251.30	50.30	204.23	-
Magnesium	mg/L	29.50	145.82	147.38	29.50	119.78	-
Manganese	mg/L	0.20	0.99	1.00	0.20	0.81	35.0
Potassium	mg/L	14.60	72.17	72.94	14.60	59.28	-
Sodium	mg/L	165.00	815.58	824.34	165.00	669.94	-
Anions							
Bicarbonate	mg/L	148.00	94.14	739.41	148.00	214.62	-
Chloride	mg/L	243.85	1205.30	1218.25	243.85	990.08	-
Phosphate	mg/L	4.90	24.37	24.48	4.90	19.98	-
Sulfate	mg/L	120.00	1119.56	599.52	120.00	806.26	-
Metals							
Antimony	mg/L	0.001	0.005	0.005	0.001	0.004	5.0
Arsensic	mg/L	0.0013	0.0064	0.0065	0.0013	0.0053	1.0
Beryllium	mg/L	0.001	0.005	0.005	0.001	0.004	0.75
Cadmium	mg/L	0.0009	0.0044	0.0045	0.0009	0.0037	0.7
Chromium	mg/L	0.0008	0.0040	0.0040	0.0008	0.0032	1.0 (0.2)[4]
Copper	mg/L	0.0041	0.0203	0.0205	0.0041	0.0166	0.4 / 1.0[5]
Lead	mg/L	0.0011	0.0054	0.0055	0.0011	0.0045	0.4
Mercury	mg/L	0.000074	0.000366	0.000370	0.000074	0.000300	0.010
Nickel	mg/L	0.0074	0.0366	0.0370	0.0074	0.0300	0.5 / 1.1[5]
Selenium	mg/L	0.001	0.005	0.005	0.001	0.004	2.0
Silver	mg/L	0.001	0.005	0.005	0.001	0.004	0.7
Zinc	mg/L	0.049	0.242	0.245	0.049	0.199	2.6 (1.0)[4]
Other							
Cyanide	mg/L	0.005	0.025	0.025	0.005	0.020	0.5
Phenols	mg/L	0.005	0.025	0.025	0.005	0.020	-
SiO2[2]	mg/L	22.07	109.09	110.26	22.07	89.61	-
TSS	mg/L	6.5	11.5	0.1	6.3	8.5	-
TDS	mg/L	810.12	3893.46	4047.33	810.12	3222.11	-
pH	Units	7.20	7.20	7.20	7.20	7.20	-

Notes

1. Estimates based upon average incoming raw water quality data provided by the SBWR and water balance diagram.
2. All silicon assumed to be in the form of SiO_2
3. Chemicals used in cooling tower treatment will not contain priority pollutants listed in 40 CFR 423.17
4. 40 CFR 423.17 cooling tower blowdown pretreatment standards for new sources given in parenthesis.
5. SJ/SC WPCP Type 2 Discharger special limits (average annual/average daily concentrations)
6. Maximum Allowable concentration from SJ/SC WPCP waste water discharge application unless otherwise noted.
7. Assumes 24 hours of operation in a 24 hour period with no duct firing at average annual ambient conditions.

CALPINE

Los Esteros CEF Phase 2 Peak Day[7] Estimated Discharge Water Quality

		Input to Waste Stream[1]					
Constituent	**Units**	**Filter Backwash**	**CT Blowdown [3]**	**RO Concentrate**	**Process Drains**	**Combined Waste**	**Max Allowable Concentration[6]**
Flow	GPM	64.69	254.65	51.75	5.00	376.09	
Cations							
Calcium	mg/L	50.30	248.84	251.30	50.30	212.39	-
Magnesium	mg/L	29.50	145.94	147.38	29.50	124.56	-
Manganese	mg/L	0.20	0.99	1.00	0.20	0.84	35.0
Potassium	mg/L	14.60	72.23	72.94	14.60	61.65	-
Sodium	mg/L	165.00	816.27	824.34	165.00	696.70	-
Anions							
Bicarbonate	mg/L	148.00	94.14	739.41	148.00	192.91	-
Chloride	mg/L	243.85	1206.33	1218.25	243.85	1029.62	-
Phosphate	mg/L	4.90	24.36	24.48	4.90	20.77	-
Sulfate	mg/L	120.00	1120.56	599.52	120.00	863.46	-
Metals							
Antimony	mg/L	0.001	0.005	0.005	0.001	0.004	5.0
Arsensic	mg/L	0.0013	0.0064	0.0065	0.0013	0.0055	1.0
Beryllium	mg/L	0.001	0.005	0.005	0.001	0.004	0.75
Cadmium	mg/L	0.0009	0.0045	0.0045	0.0009	0.0038	0.7
Chromium	mg/L	0.0008	0.0040	0.0040	0.0008	0.0034	1.0 (0.2)[4]
Copper	mg/L	0.0041	0.0203	0.0205	0.0041	0.0173	0.4 / 1.0 [5]
Lead	mg/L	0.0011	0.0054	0.0055	0.0011	0.0046	0.4
Mercury	mg/L	0.000074	0.000366	0.000370	0.000074	0.000312	0.010
Nickel	mg/L	0.0074	0.0366	0.0370	0.0074	0.0312	0.5 / 1.1 [5]
Selenium	mg/L	0.001	0.005	0.005	0.001	0.004	2.0
Silver	mg/L	0.001	0.005	0.005	0.001	0.004	0.7
Zinc	mg/L	0.049	0.242	0.245	0.049	0.207	2.6 (1.0)[4]
Other							
Cyanide	mg/L	0.005	0.025	0.025	0.005	0.021	0.5
Phenols	mg/L	0.005	0.025	0.025	0.005	0.021	-
SiO2[2]	mg/L	22.07	109.18	110.26	22.07	93.19	-
TSS	mg/L	6.5	11.5	0.1	6.3	9.0	-
TDS	mg/L	810.12	3896.73	4047.33	810.12	3345.51	-
pH	Units	7.20	7.20	7.20	7.20	7.20	-

Notes

1. Estimates based upon average incoming raw water quality data provided by the SBWR and water balance diagram.
2. All silicon assumed to be in the form of SiO2
3. Chemicals used in cooling tower treatment will not contain priority pollutants listed in 40 CFR 423.17
4. 40 CFR 423.17 cooling tower blowdown pretreatment standards for new sources given in parenthesis.
5. SJ/SC WPCP Type 2 Discharger special limits (average annual/average daily concentrations)
6. Maximum Allowable concentration from SJ/SC WPCP waste water discharge application unless otherwise noted.
7. Assumes 7 hours of duct firing under peak summer conditions, 7 hours of peak summer operation without duct firing, and 10 hours of operation at average annual ambient conditions without duct firing.

ATTACHMENT SW-2

Draft Storm Water Pollution Prevention Plan

and

Draft Erosion Control Plan

Los Esteros Critical Energy Facility

Draft Phase 2 Construction Storm Water Pollution Prevention Plan

Prepared for

Los Esteros Critical Energy Facility, LLC

April 2004

CH2MHILL

2485 Natomas Park Drive
Sacramento, California 95833

Contents

page

ATTACHMENTS

1.0 Introduction

1.1 Objectives

This Storm Water Pollution Prevention Plan[1] (SWPPP) was developed to address the new construction activity associated with construction of the permanent storm water outfall and with construction of Phase 2 of the Los Esteros Critical Energy Facility (LECEF). The construction of the permanent storm water outfall is a Phase 1 activity and is subject to the Phase 1 Final Decision. Phase 2 involves the conversion of the existing, simple-cycle facility to combined-cycle operation through the addition of a steam turbine, 6-celled cooling tower, and ancillary equipment. As required by the State Water Resources Control Board (SWRCB), this SWPPP was developed and will be amended or revised, when necessary, to meet the following objectives:

- Identify all pollutant sources including sources of sediment that may affect the quality of storm water discharges associated with construction activity (storm water discharges) from the construction site;
- Identify non-storm water discharges;
- Identify, construct, implement and maintain Best Management Practices (BMPs) to reduce or eliminate pollutants in storm water discharges and authorized non-storm water discharges from the construction site during construction, and
- Develop a maintenance schedule for BMPs installed during construction designed to reduce or eliminate pollutants after construction is completed (post-construction BMPs).

1.2 Project Overview

The Los Esteros Critical Energy Facility (LECEF) is located in north San Jose, California at 800 Thomas Foon Chew Way (Attachment 1). The site is on the north side of State Route 237, west of Coyote Creek and east of Zanker Road. Northwest of the site is the San Jose/Santa Clara Water Pollution Control Plant (WPCP). The WPCP buffer lands lie

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[1] In 1972, the Federal Water Pollution Control Act (also referred to as the Clean Water Act [CWA]) was amended to provide that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge is in compliance with a National Pollution Discharge Elimination System (NPDES) permit. The 1987 amendments to the CWA added Section 402(p), which established a framework for regulating municipal and industrial storm water discharges under the NPDES Program. On November 16, 1990, the U.S. Environmental Protection Agency (USEPA) published final regulations that establish storm water permit application requirements for specified categories of industries. The regulations provide that discharges of storm water to waters of the United States from construction projects that encompass five (5) or more acres of soil disturbance are effectively prohibited unless the discharge is in compliance with an NPDES Permit. While federal regulations allow two permitting options for storm water discharges (individual permits and General Permits), the California State Water Resources Control Board elected to adopt only one statewide General Permit that (with few exceptions) apply to all storm water discharges associated with construction activity, upon submittal of a Notice of Intent to comply, certain fees and a Stormwater Pollution Prevention Plan. The SWPPP must be kept onsite during construction and made available upon request by a representative of the Regional Water Quality Control Board or local agency.

to the west of the site, while to the north are Pacific Gas & Electric's (PG&E's) Los Esteros Substation, Silicon Valley Power's (SVP's) Switching Station, and the WPCP sludge drying ponds.

Phase 2 of the LECEF will convert the existing nominal 180-megawatt (MW) natural-gas-fired simple-cycle peaking power plant developed under Phase 1 of the project to a combined-cycle plant. The Phase 2 conversion includes the addition of HRSG tube sections and associated evaporator drums and piping, HRSG duct burners, a nominal 140 MW steam turbine generator, a six-cell cooling tower, ancillary equipment, and a 230 kV transmission interconnection with the SVP Switching Station. Natural gas for the facility is delivered through a 600-foot long 10" diameter pipeline that connects to both of PG&E's existing lines located adjacent to State Route 237, approximately 0.5 miles from the PG&E Milpitas Gas terminal.

The Applicant constructed Phase 1 of LECEF on a 55-acre parcel of agricultural land. The power plant site required 20.8 acres to accommodate the generation facilities, including the storage tank areas, parking area, control/administration building, water treatment building, switchyard, emission control equipment, and generation equipment. Additional construction under Phase 2 will affect approximately 0.5 acres of the 20.8-acre site by adding equipment and support structures to the already constructed Phase 1 portion of the project. In addition, a 10 to 12-acre laydown area will be required for construction of Phase 2. This laydown area is located immediately south of LECEF on an adjoining parcel.

The linear facilities associated with LECEF Phase 1 include the following:

- Approximately 150 feet of aerial interconnect to Pacific Gas & Electric's (PG&E) 115 kV Los Esteros-Nortech transmission line (already constructed).
- Approximately 550 feet of natural gas supply line (already constructed).
- Approximately 2,000 feet of wastewater discharge line (already constructed).
- Approximately 1,500 feet of recycled water supply line (already constructed).
- Approximately 2,700 feet of primary access road, Thomas Foon Chew Way (already constructed).
- Approximately 470 feet of emergency access road (already constructed).
- Approximately 1,000 feet of storm water discharge line between the facility and the Coyote Creek high –flow channel to the east (already constructed).
- In accordance with existing Conditions of Certification, permit applications are currently in process for construction of a permanent storm water outfall that extend the drain approximately 250 feet into the low-flow channel of Coyote Creek.
- The linear facilities associated with LECEF Phase 2 include the following:
- Interconnection to the planned Silicon Valley Power (SVP) Switching Station adjacent to the LECEF, via approximately 50 feet of overhead transmission line

1.3 Project Ownership

Los Esteros Critical Energy Facility, LLC is the sponsor and owner of LECEF.

1.4 Implementation Schedule

The Application for Certification (AFC) for the LECEF Phase 2 conversion was filed with the California Energy Commission (CEC) on December 30, 2003. The CEC license for Phase 2 is expected to be granted in late 2004 or early 2005. The start of construction and operation of Phase 2 will be determined when construction is financed, following licensing. Construction is currently planned to begin in September 2006, with initial startup in January 2008 and commercial operation in April 2008. This schedule may be subject to change, due to uncertainties having to do with permitting processes and financing.

The construction of the permanent storm water outfall is expected to occur during the summer of 2005.

The phases of the LECEF Phase 2 construction as they pertain to storm water management are as follows:

- Preparation - Parking areas for construction workers and laydown areas for construction materials will be prepared. Straw wattles will be placed around the LECEF perimeter where no permanent drainage infrastructure already exists. All debris on the project site was previously removed and disposed of properly.
- Site Grading - Gradual slopes have already been established across the project area within the site perimeter during Phase 1. Straw wattles will direct drainage towards constructed temporary and/or existing swales.
- Foundation/Concrete Work - All underground piping and wiring will be installed, followed by installation of the foundation for the new cooling tower and steam turbine generator structures. Sheet flow utilizing a combination of the storm water drains and underground conveyance piping constructed during Phase 1, augmented as needed by straw wattles and temporary swales will serve as the means of controlling storm water sediment transport.
- Plant Construction/Mechanical Work – The Phase 2 installation will be tied into storm water ditches and storm drains constructed around the perimeter of the site during Phase 1. The temporary grassy swale storm water ditch system will be constructed for the laydown area. This temporary system will tie in to the existing grassy swale storm water ditch system along the southern perimeter of the project site. Storm water from the construction laydown area and parking areas will be directed via swales into the storm water ditches. The combined system of storm water ditches and storm drains directs runoff from the power plant site to the lift station located on the east side of the site. Storm water from the lift station will be pumped to a new gravity outfall into the Coyote Creek low-flow channel.

- Site Stabilization - Permanent storm water management devices will replace any temporary items. Site re-seeding and re-landscaping will be conducted if needed.
- Demobilization - All temporary construction facilities will be removed. Storm water will continue to be directed as before.

A Notice of Intent (NOI) to comply with the terms of the General Permit To Discharge Storm Water Associated With Construction Activity will be prepared and submitted prior to the commencement of the permanent storm water outfall construction and of Phase 2 construction (Appendix B). Any necessary revisions to the SWPPP will be prepared in a timely manner. The SWPPP will be amended whenever there is a change in construction or operations that may affect the discharge of pollutants to surface waters. As required by the SWRCB, a separate NOI shall be submitted to the Regional Board for each construction site and a separate storm water plan will describe operations there. Once construction activity has been concluded, a Notice of Termination Form will be submitted to the Regional Board and this Construction SWPPP will no longer be in effect. Storm water for the LECEF will then be managed under the facility's Industrial Storm Water Pollution Prevention Plan, in accordance with the facility’s NPDES permit (WDID no. 2 43I017829), as it is presently being managed for the portion of the facility constructed in Phase 1.

1.5 Plan Availability

The SWPPP will remain on the construction site while the site is under construction commencing with the initial construction activity and ending with termination of coverage under the General Permit. Copies of the California General Permit and the industrial NPDES permit for LECEF will also be maintained on the construction site. The SWPPP will be provided to the Regional Board upon request, and be available to the public through the Regional Board.

2.0 Site Description

2.1 Project Activity

The project site is located at the northern end of the Santa Clara Valley, near the southern limit of San Francisco Bay. The region is characterized by northwest-trending ridges and valleys which parallel northwest-trending folds and strike-slip faults. Coyote Creek flows northward past the site and into San Francisco Bay to the northwest. The LECEF site is in the Alviso area in the northern part of San Jose. The parcel was previously utilized for agricultural, commercial and residential needs including plant nurseries, storage buildings, and residential structures. The project site is relatively flat and the elevation ranges from approximately 10 to 15 feet above mean sea level. Phase 1 of the project was constructed in 2002-2003 and is now operational. General site grading was completed during Phase 1 construction.

2.2 Vegetation

The LECEF project site is located 1,000 feet west of Coyote Creek, a natural stream channel which flows north to South San Francisco Bay. Coyote Creek supports a narrow band of mature native woody vegetation including Fremont cottonwood, red willow, box elder, coast live oak, arroyo willow, western sycamore, and black walnut. There are no wetlands on the LECEF project site (WRA 2000). Most of the area east of Coyote Creek, and south of the project site, is covered with urban and developed habitat. The only vegetation tends to be landscape trees, shrubs and lawns in residential areas. Agricultural lands, comprising primarily pasture and hay crops dominate the area surrounding the project site.

The new linear features include an electric transmission interconnection and a permanent storm water outfall. The electric interconnection line connects LECEF power lines to SVP's 230 kV Switching Station immediately to the north of LECEF. The existing storm drain force main allows discharge of storm water from non-process areas of the LECEF to Coyote Creek, and runs east from the site about 750 feet across the Cilker property to the creek levee. From there an existing gravity pipeline drains into the high-flow channel of Coyote Creek. This gravity pipeline will be replaced with a gravity pipeline that will drain into the low-flow channel of Coyote Creek (an additional 250 feet).

2.3 Soils

Soils are mapped and described as "mapping units" that are defined to the approximate level of detail required for soil management decision making. The location and properties of the soil mapping units were identified from maps of the area prepared by the U.S. Soil Conservation Service (now called Natural Resources Conservation Service [NRCS]). These soil maps and properties were obtained from the *Soil Survey of Santa*

Clara Area (U.S. Department of Agriculture [USDA], 1974). Soil erodibility factors were obtained from the USDA field office in Templeland, California. The soil types within the project area are the Mocho clay loam (Mi), Mocho loam over Campbell- and Cropley-like soils (Mo), and Mocho loam (Mq). A detailed description of the soils can be found in Table 2.3-1.

TABLE 2.3-1
Soil Mapping Units Description and Properties[a]

Soil Series	Texture	Slope (%)	Drainage	Permeability (in/hr)[b]	Erodibility factor - K (tons/ac)	Erosion Hazard	Surface runoff rate	Revegetation Potential[c]
Mocho	Clay loam	0-1	Well drained	Surface soil-moderate; subsoil-slow	0.15	Slight	Very slow	Free of alkali-very good; slight alkali-good; moderate alkali-fair; strong alkali-poor
Mocho over Campb ell or Cropley	Loam over clay loam	1-3	Well drained	Surface soil-moderate; subsoil-moderate to slow	0.15	Slight	Slow	Very good
Mocho	Loam	1-3	Well drained	Surface soil-moderate; subsoil-moderate	0.15	Slight	Slow	Free of alkali-good; slight alkali-good

[a] All data, except revegetation potential obtained from NRCS publications and reports; ND—no data available.
[b] Permeability ratings (units in inches per hour): Very slow — < 0.06, slow – 0.06 to 0.20, moderately slow – 0.20 to 0.60, moderate – 0.60 to 2.00, moderately rapid – 2.00 to 6.00, rapid – 6.00 to 20.00, and very rapid — > 20.00.
[c] Based on suitability for non-irrigated rangeland.

2.4 Local Precipitation

Most of the precipitation in the San Jose area falls in the November through April period. This is also characteristic of the project site. Monthly average rainfall near the project site is presented in Table 2. The total annual average rainfall is 14.42 inches.

TABLE 2
Average Monthly Rainfall near the Proposed Project Site (San Jose), 1950 – 1998

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall (in.)	2.78	2.16	2.58	1.17	0.26	0.05	0.06	0.12	0.24	0.9	2.11	1.99

2.5 Estimated Total Site Area and Total Disturbed Area

Approximately 13.5 acres will likely be disturbed during Phase 2 construction, including the 0.5-acre LECEF Phase 2 construction areas (switchyard expansion, steam turbine equipment, and ancillary equipment), and an approximately 13-acre construction laydown area, temporary stockpiling, and parking area located on the adjacent parcel to the south of LECEF.

2.6 Existing Drainage

Most of the lands surrounding the project site currently drain overland to ditches along Zanker Road. These ditches discharge to the WPCP drainage culverts near the sludge ponds, which ultimately discharge to Artesian Slough north of Los Esteros Road. Flows from Artesian Slough discharge to Coyote Creek near the Alameda County-Santa Clara County line. A culvert and flap gate in the easternmost portion of the site is elevated above the existing ground surface. If flooded, the site could drain to the adjacent Coyote Creek by-pass channel via the existing 24" culvert and outfall with a flap gate.

The Phase 1 project constructed a combined system of storm water ditches and storm drains around the site perimeter to convey non-process area runoff to a lift station along the eastern boundary of the site (Attachment 2). This lift station pumps the combined flows to the temporary outfall via a 24" storm drain force main. The outfall makes use of the existing 24-inch corrugated metal pipe (CMP) placed through the west levee of Coyote Creek. The CMP outfalls onto a maintenance road located between the levee and the high-flow channel. A small three- to five-foot berm separates the high-flow channel from the natural channel. The high-flow channel is a grassy field about 200 feet wide, with a graded swale, near its center, to direct flows to the north. Water that is discharged through the 24-inch CMP falls onto a 20-foot wide concrete pad constructed as part of the outfall, passes over a 5-foot wide section of rock rip-rap and onto the grassy area of the high-flow channel. The water will then flow north toward the natural channel of Coyote Creek.

The project storm water swales and storm water pumps are designed to accommodate 25-year storm events. Runoff during events with recurrence intervals greater than 25 years are stored in the drainage system and earth ditches. Beyond the on-site storage, storm water is permitted to flow overland to the northwest following existing drainage patterns. Wash down and drainage from facility equipment areas are collected in a separate system of floor drains, sumps, and piping routed to the oil/water separator and ultimately to the sanitary sewer system.

2.7 Proposed Drainage

During construction, storm water from the laydown area of the site will be directed either to temporary constructed swales or to storm drains and swales constructed during Phase 1 of the project. The temporary constructed swales will direct the storm water to the existing storm water drains and swales. The construction of the permanent storm water outfall will allow the discharge of the site storm water to drain to the natural (low-flow) channel of Coyote Creek.

Excavation of the storm water swales and installation of the storm drains will occur in such a way that groundwater will not be encountered.

2.8 Earthwork

Excavation work will consist of the removal, storage, and/or disposal of earth, sand, gravel, vegetation, organic matter, loose rock, boulders, and debris to the lines and grades necessary for construction of the permanent storm water outfall and the Phase 2 facilities. Overall site grading was completed during Phase 1 construction, so Phase 2 excavation will be focused on what is needed for construction of foundations for the cooling towers, switchyard, and steam turbine generator equipment pad. Materials suitable for backfill will be stored in a stockpile at a designated location using proper erosion control measures. Although it is not anticipated that contaminated material will be encountered during excavation, should it be, its disposal will comply with applicable federal, state, and local regulations.

2.9 Name of Receiving Water

Storm water in the undeveloped portion of the LECEF property generally follows existing overland drainage patterns, directed through either constructed temporary swales or straw wattles, before discharge to Artesian Slough, Coyote Creek and ultimately San Francisco Bay. The combined system of storm water ditches and storm drains surrounding the LECEF directs flows to a lift station along the eastern boundary of the site, from which the storm water is discharged to Coyote Creek via a storm drain force main and outfall.

2.10 Potential Pollutant Sources

Construction of the project will involve handling of a large variety of building materials. Acutely hazardous materials, as defined in California's Health and Safety Code Section 25531, will not be used. Hazardous materials to be used during construction of the project and its associated linear facilities will be limited to gasoline, diesel fuel, motor oil, hydraulic fluid, solvents, cleaners, sealants, welding flux, various lubricants, paint, and paint thinner. A list of typical construction site potential pollutants is given in Appendix A. The primary potential pollutant source for storm water during the construction of the LECEF results from soil materials being exposed to wind and water movement. The greatest amount of soil was exposed during the Preparation and Site Grading Phases of the project which were completed mainly during Phase 1 construction. Upon completion of the Foundation Phase, the amount of soil exposed was significantly reduced. Due to the controls and Best Management Practices (BMPs) described in subsequent sections of this SWPPP, soils and sediments in storm water runoff from the LECEF site will be minimized, and then significantly reduced or eliminated prior to discharge from the site.

3.0 Erosion Control Plan

3.1 Best Management Practices (BMPs)

The following section presents standard construction practice Best Management Practices (BMPs) most of which are described in the California Stormwater Best Management Practice Handbook for Construction (2003), the Caltrans Storm Water Quality Handbooks (2003), California RWQCB Erosion and Sediment Control Field Manual (1999), and Salix Applied Earthcare Erosion Control Standards (2002). These resources provide comprehensive details on BMP implementation and should be reviewed by managers for all construction contractors that may have an impact on implementation of the SWPPP. The BMPs outlined in this SWPPP are considered the minimum requirements for erosion and sediment control. The contractor may implement additional control measures if necessary. Any necessary changes or additions will be documented and included in the SWPPP, following the Amendment Form.

3.2 General Erosion Control Measures

The project has been designed to impact as small an area as possible, thereby limiting the amount of disturbed vegetation and exposed soil. Construction is expected to proceed with all appropriate speed, as quickly as is reasonable and safe, thereby ensuring that as little soil is exposed for as short a time as possible. All work areas will employ, but not be limited to, the following BMPs: dikes, drainage swales, or straw wattles, or combinations of these to prevent run-on and uncontrolled run-off. General erosion and sediment controls will include installation of straw wattles wherever appropriate.

All equipment will be maintained to prevent leaks and spills, and fueling will only be conducted within contained areas. Spill containment equipment and instructions will be available in the event of a spill. Any contaminated soils resulting from spills will be dug up as quickly as possible, and then removed from the site for proper disposal.

Designated site personnel will receive training to conduct their jobs properly and recognize and report aberrant situations so that they can be quickly corrected.

Detailed BMP instructions are included in Appendix C of this document, unless otherwise noted. It is the responsibility of the contractor and all sub-contractors to read and be familiar with the BMPs and their installation. Because the nature of the construction site is ever changing, it is the also the responsibility of the Contractor to update, improve, and maintain all BMPs. The instructions included in this SWPPP are to be considered minimum requirements and amendments and changes will be noted and included in this SWPPP.

3.2.1 Access Road, Entrance, and Parking, Staging and Laydown Areas

The paved access road and site entrance areas were constructed during Phase 1. Areas to be used for parking, staging and laydown during Phase 2 construction will be stabilized using coarse aggregate. The aggregate cover will be maintained so as to limit sediment tracking and creation of dust. Surfaces will be watered, or use an alternative control measure, such as an approved chemical dust control, to further reduce generation of dust and sediment loss. Water will be controlled to prevent excess runoff. Straw wattles will be used at edges of these areas to minimize sediment discharging into swales or ditches. It may be necessary to install geotextile matting prior to the coarse aggregate in certain parking, staging and laydown areas to further assist with stabilization.

The following BMPs will be utilized:

- Proper scheduling and sequencing of activities
- Stabilized Entrance and Stabilized Exit
- Stabilizing surfaces with coarse aggregate
- Compacting access road surfaces
- Dust control

3.2.2 Site Grading, and Drainage Swales

The work site has already been graded, and is contoured to have a gentle slope generally following natural drainage patterns. In areas to be excavated for foundation construction inside the LECEF fenceline, and along the perimeter of the laydown area, straw wattles will reduce water velocity and trap transported sediment. Temporary ditches and swales will be constructed as necessary to control runoff. If it is necessary to establish temporary stockpiles of soil or excavated material, the downslope side of the stockpiles will be surrounded with straw wattles, and covered with tarps or treated chemically if exposed for an extended time.

If needed, periodic check dams constructed using straw wattles will be placed in the swales to further reduce water velocity and trap sediment. In addition, petroleum-absorbing fabric will be staked into position above one or more of the check dams. At a minimum, petroleum-absorbing fabric will be placed above the last check dam or barrier upstream of any temporary swale. This will limit or prevent hydrocarbons resulting from incidental leaks or drips from entering the temporary swales.

The following BMPs will be utilized:

- Existing storm water drains
- Temporary drains and swales
- Straw wattle check dams

3.2.3 Foundations

As the foundation for the additional power plant structures are developed, temporary drainage swales and straw wattles will be replaced with surface collectors and underground drainpipes. Sediments and hydrocarbons will be minimized or prevented from entering the newly installed surface collectors with storm drain inlet protection devices and rings of hydrocarbon-absorbing fabric for the duration of construction activities.

A concrete washout will be located in the designated laydown area. This washout will be at least 50 feet from storm drains, open ditches and water bodies. Dumping of excess concrete and washing out of delivery vehicles will be prohibited at other locations on site. Notices will be posted to inform all drivers.

The following BMPs will be utilized:

- Storm drain inlet protection
- Concrete waste management

3.2.4 Site Stabilization and Demobilization

As construction nears completion, areas used for parking, storage and laydown can be stabilized. This means that areas that will continue to be utilized (e.g., for parking, storage, etc.) will have permanent storm water collection and conveyance structures provided, and other areas can be seeded and/or provided with landscaping and vegetative cover. Vegetative cover significantly reduces the likelihood of erosion and sediment transport. Native vegetation will be used whenever possible in revegetation efforts.

Vegetation restoration will be monitored following the completion of construction. Areas where vegetation is not re-established or where erosion takes place will be identified, and appropriate remedial actions implemented. Potential actions will include additional seeding, installation of irrigation systems to promote vegetation growth, regrading, or installation of engineered structures to control surface-runoff. Corrective actions will be implemented as soon as feasible, but not later than the start of the next rainy season.

Vegetation monitoring will be conducted as part of routine project maintenance activities, and after major storm events. Areas that have been re-seeded will be monitored at least annually for a period of 2 years following seeding. When needed, additional remedial measures will be implemented as part of the project maintenance program.

3.3 Other Controls

3.3.1 Contractor Waste

The generation of waste materials will be minimized through efficient and careful use of materials. Non-hazardous materials will be utilized where acceptable to meet construction requirements. Manufacturers' instructions regarding use and proper disposal of hazardous materials will be followed. Chemicals, drums and bagged materials will not be stored directly on the ground, and will be covered or stored in locked containers where feasible. Incompatible materials will be separated, and secondary containment will be provided for liquids. Sufficient spill cleanup materials will be kept in proximity to areas where hazardous materials are stored and used. Appropriate fire suppression equipment will be available.

Contractor waste materials will be collected and stored in approved containers provided by a licensed solid waste management company. The containers will meet local and state solid waste management regulations. Trash and construction debris will be hauled offsite to an approved landfill. No construction waste will be buried onsite. Personnel will be instructed as to proper disposal procedures, notices will be posted, and individuals will be designated to assure that the procedures are followed.

A licensed contractor will regularly collect all sanitary wastes from portable units.

In the event that hazardous waste is generated, all hazardous waste will be secured in separate containers for storage in designated areas, followed by offsite management according to regulations.

The following BMPs will be utilized:

- Cover or store hazardous materials
- Material delivery and storage
- Material use
- Spill Prevention and Control (detailed in Section 5.4.4)
- Solid Waste Management
- Hazardous Waste Management
- Use of covered containers for waste
- Use of designated storage areas

3.3.2 Groundwater Controls

Construction excavations will be dewatered if necessary by pumping any groundwater encountered into movable steel wier storage tanks located on-site. Samples will be taken from each storage tank and sent to a California State-certified analytical laboratory for testing if visual monitoring indicates potential contamination. If any contamination is detected, the waste will be handled and properly disposed of in a manner consistent with Federal, State, and local regulations. Otherwise, the stored groundwater will be pumped to the storm water ditches, used for dust control or discharged to the adjacent agricultural area when appropriate. Any stored water not being used for dust control, will be further treated using a sand media particulate filter and filter aid such as Chitosan prior to discharge.

The weir tank provides a means of removing larger particulates prior to filtration. This water can be directly pumped into a water truck for use as dust control. Any water not being diverted for dust control will move from the weir tank through an inline pump to the filter media and then through the sand media particulate filter. The in-line pump will be capable of 40 psi at 250 GPM. The filter media, Chitosan, is an approved medium used to coagulate fine particulates prior to entering the sand media particulate filters.

3.3.3 Offsite Vehicle Tracking

Because sediment reaching public roads generally has a clear path to wetlands and water bodies, controls will be in place to minimize or eliminate soils from being tracked off the project site by vehicles. The site will have roadways and parking areas made of coarse aggregate to limit the amount of material adhering to tires. Paved roads immediately surrounding the construction site will be inspected daily and cleaned as necessary using manual or mechanical street sweepers.

3.3.4 Dust Suppression and Control

Wind may also result in airborne particulate matter, so controls will be in place to reduce or eliminate blowing dust and debris. The following suppression and control methods will be used:

- Water aggregate roadways, parking areas and construction areas as needed and keep paved roads swept.
- Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least eighteen inches of freeboard.
- Sweep adjacent streets and on-site paved roadways.
- Hydroseed or apply non-toxic soil stabilizers to inactive or completed construction areas as soon as is practical.
- Enclose, cover, water or apply non-toxic soil stabilizers to exposed stockpiles of sand, dirt, etc.
- Limit traffic speed onsite to 15 mph or less.
- Suspend excavation and grading during periods of high winds.
- Replant vegetation in disturbed areas as quickly as possible.

3.3.5 Awareness of Potential Prior Industrial Waste

It is possible that previously unknown pockets of contaminants from prior industrial activity may be encountered during construction. Operators of heavy equipment during excavation activity will be asked to report unusual conditions to their supervisor. If any of the following are encountered during earthmoving activities, operators are to inform their supervisors:

- Buried tanks, drums or containers
- Discolored or oily soil
- Unusual odors
- Material that is smoking or fuming

Supervisors will report the conditions to the Project Supervisor and/or the environmental manager for the LECEF. They will be responsible for investigating the situation and providing advice for next steps and further action.

3.3.6 Water Quality Monitoring

Despite the implementation of Best Management Practices, there is still the possibility of pollution entering the storm water drainage system. Under certain circumstances, California WRCB Resolution #2001-046, dated July 31, 2001, requires sampling for pollutants that are not visually detectable. Applicable to this project is the mandate that water quality be sampled under the following conditions:

- Visual inspections, currently required before, during and after storm events, indicate that there has been a breach, malfunction, leakage, or spill from a BMP that could result in the discharge of pollutants in storm water and the pollutants would not be visually detectable; or
- Storm water comes into contact with soil amendments, other exposed materials, or site contamination that is allowed to be discharged off the construction site.

More information on Sampling and Analysis of Non-Visible Pollution in Storm Water is included in Appendix D.

3.4 Training

Prior to project startup, all designated onsite representatives will participate in a pre-project storm water training workshop. The workshop will cover basic storm water information, the requirements of the general permit for construction, the NPDES permit for operation, and the construction and industrial SWPPPs. Specifically, the workshop will focus on implementation, inspection, and maintenance of storm-water controls. All new employees will be trained by staff familiar with these topics.

As required by the SWRCB, individuals responsible for SWPPP preparation, implementation, and permit compliance will be appropriately trained, and the training will be documented. This includes those personnel responsible for installation, inspection, maintenance, and repair of BMPs. Those responsible for overseeing, revising, and amending the SWPPP shall also document their training.

All contractors are responsible for familiarizing their personnel with the information contained in the SWPPP. Contractors will be informed of this obligation and will be expected to have one or more employee training or briefing sessions conducted. The purpose of the meetings will be to review the proper installation methods and maintenance of all erosion control BMPs to be used on the project. Monitoring and inspection activities will only be conducted by individuals who have had additional training specific for this purpose. Records of training will be maintained and kept on site with the SWPPP. Each contractor will be required to certify that they understand the requirements of the SWPPP, and will perform their duties in accordance with its requirements.

4.0 Maintenance, Inspection, and Repair

4.1 Maintenance

Erosion and sediment control structures must be maintained to remain effective. Features that are washed out or damaged will be repaired as soon as possible. Structures designed to accumulate sediment will have sediment removed in advance of the rainy season, and prior to any major storm events. The following criteria will be used to determine whether erosion and sediment control features should be cleaned, repaired, or replaced:

- Sediment or other debris has accumulated to greater than one-third the height of sediment control devices
- More than one-third of the cross-section of conveyance structures, such as drainage swales or ditches are plugged or blocked

In addition, the following maintenance activities will be performed:

- Paved roads immediately surrounding the construction site will be cleaned as necessary using manual or mechanical street sweepers.
- Coarse aggregate on access roads and parking areas will be maintained so as to limit sediment tracking and creation of dust.
- Coarse aggregate surfaces and excavations will be watered to limit the generation of dust (but will not be excessively watered so as to prevent generating runoff).
- All equipment will be maintained according to manufacturers' specifications so as to prevent leaks and spills.
- Any contaminated soils resulting from spills will be dug up as quickly as possible, and then removed from the site for proper disposal.

4.2 Inspections

Inspections of the construction site will be conducted on a regular basis and prior to anticipated storm events and after actual storm events that have rainfall of 0.05 inches. Inspections will be made during each 24-hour period during extended storm events. SWPPP inspections may be conducted in conjunction with other facility inspections. For instance, if a regulated amount of petroleum materials is on site and there is a Spill Prevention, Control and Countermeasures Plan (SPCC), the SWPPP inspections may be conducted in conjunction with SPCC inspections.

The goals of these inspections are (1) to identify areas contributing to a storm water discharge; (2) to evaluate whether measures to reduce pollutant loadings identified in the SWPPP are adequate, properly installed and functioning in accordance with the terms of the General Permit; and (3) whether additional control practices or corrective maintenance activities are needed.

Personnel responsible for inspections before, during and after storm events will receive additional training specific for this purpose. This can take the form of formal classroom training and/or "walk-around" with an experienced individual, who discusses the appropriate conditions and those conditions requiring action. The Project Manager (or designee) will maintain a list of authorized inspection individuals for the SWPPP (Attachment 3).

All required inspections will be recorded on an inspection checklist. Records of SWPPP inspections will be maintained onsite for at least three years. An example checklist is shown in Attachment 4, and contains the following information required by the RWQCB:

- Inspection date.
- Weather information: best estimate of beginning of storm event, duration of event, time elapsed since last storm, and approximate amount of rainfall (inches).
- A description of any inadequate BMPs.
- If it is possible to safely access during inclement weather, list observations of all BMPs: erosion controls, sediment controls, chemical and waste controls, and non-storm water controls. Otherwise, list result of visual inspection at relevant outfall, discharge point, or downstream location and projected required maintenance activities.
- Corrective actions required, including any changes to SWPPP necessary and implementation dates.
- Inspector's name, title, and signature.

Records of all monitoring information, copies of all reports required by the general storm-water permit, and records of all data used to complete the Notice of Intent for the construction activity shall be held, retained, and kept in possession by the facility operator and/or constructor for at least 3 years.

The facility operator and/or constructor will annually certify that its construction activity is in compliance with the requirements of this general permit and its SWPPP. Noncompliance notifications will be submitted within 30 days of identification of noncompliance.

Equipment, materials, and workers will be available for rapid response to failures and emergencies. All corrective maintenance to BMPs will be performed as soon as possible, depending upon worker safety.

5.0 Non-Storm-Water Management

5.1 General

Non-storm-water management at the construction site involves prevention of contamination in runoff associated with water sprayed for dust control and irrigation. Non-storm water discharges from the project site will be minimal due to effective implementation of control practices. These control practices and BMPs were discussed in the Erosion Control Plan, Section 3, but are summarized here again.

5.2 Inventory for Pollution Prevention Plan

The following substances listed below are expected to be present on site during construction:

- Concrete
- Paints
- Detergents
- Fertilizers
- Fuels
- Lubricants
- Wood
- Solvents

As required by state and federal law, contractors will be required to have inventories of hazardous materials. If the use of other types of hazardous materials at the site becomes necessary, the SWPPPP will be amended to include them. See Appendix A for a more extensive list of potential pollutants on-site.

5.3 Hazardous Materials Management Plan

Typically, contractors are the generators of waste oil and miscellaneous hazardous waste produced during facility construction and are responsible for compliance with state and federal regulations regarding hazardous waste, including licensing, training, accumulation limits, reporting requirements, and record keeping. Hazardous waste will be collected in hazardous waste accumulation containers near the point of generation.

Potential pollutants used at the facility during construction include paints, petroleum products, and building materials such as asphalt, sealants, and concrete. These may contain small amounts of metals or toxic substances that may be harmful. General BMPs for waste management were cited in Section 3, Controls above, and additional discussion is provided below.

5.4 Prevention of Non-Storm water Discharges

There will be specific designated temporary waste storage areas on site**.** These areas will be contained within earthen berms or an equivalent barrier measure. Non-hazardous construction wastes (trash and construction debris) will be collected and placed into commercial disposal containers as soon as possible.

BMPs that will be implemented to prevent non-storm water discharges include:

- Monitor all vehicle and equipment fueling and maintenance activities; perform fueling offsite wherever possible.
- Secondary containment for hazardous material delivery and storage areas to prevent spills or leakage of liquid material from contaminating soil or soaking into the ground.
- Train employees on the proper use of materials such as fuel, oil, asphalt and concrete compounds, acids, glues, paints, solvents, etc.
- Regularly remove construction wastes.
- Store all liquid wastes in covered containers.
- Use portable toilet facilities managed and regularly serviced by a licensed contractor.
- Restrict vehicle and equipment washing to designated areas.

5.4.1 Good Housekeeping

The following good housekeeping practices will be followed on site during the construction project:

- An effort will be made to store only enough product required to do the job.
- All materials stored on site will be stored in a neat, orderly manner in their appropriate containers, and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used before disposing of the container.
- Manufacturers' recommendations for proper use and disposal will be followed.
- Storage areas including equipment storage will be inspected for visible signs of oil or other spillages.

5.4.2 Hazardous Products

Products will be kept in the original containers unless they are not resealable. Original labels and material safety data will be retained. If surplus product must be disposed of, manufacturers' or local and State recommended methods for proper disposal will be followed.

5.4.3 Product Specific Practices

The following product specific practices will be followed onsite:

Petroleum Products: All onsite vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the potential for leakage. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Asphalt substances used on site will be applied according to the manufacturers' recommendations.

Fertilizers: Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked in the soil to limit exposure to storm water. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills. Fertilizer will be applied a minimum of 48 hours prior to a storm event.

Paints: Containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system but will be properly disposed of according to manufacturers' instructions and State and local regulations.

Concrete Trucks: Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water on the site except in areas specifically designated for rinse out as indicated in Section 3.2.3. Wash water will be contained in a temporary pit where waste concrete can harden for later removal. Washing of fresh concrete will be avoided unless runoff may be drained to a bermed or level area, away from waterways and storm drain inlets.

5.4.4 Spill Prevention Practices

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

- Manufacturers' recommended methods for spill cleanup will be clearly posted and personnel will be made aware of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not be limited to brooms, dustpans, mops, rags, gloves, goggles, absorbents (e.g., kitty litter, sand, sawdust), and plastic and metal trash containers specifically for this purpose.
- Spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- The Project Manager (or designee) will be the spill prevention and cleanup coordinator. The names of additional responsible spill personnel and authorized contractors will be posted in various areas.

- Spills of toxic or hazardous material will be reported to the Project Supervisor (or designee), regardless of the size.
- Spills of hazardous materials that exceed their Reportable Quantity, will be reported to all appropriate local, state and federal government agencies.

Contaminated soil and debris that cannot be recycled, reused or salvaged, will be collected and stored in securely lidded dumpsters rented from a licensed solid waste management company. The dumpsters will meet all local and State of California solid waste management regulations. Potentially hazardous wastes will be separated from known non-hazardous wastes. This includes the segregation of storage areas and proper labeling of containers. All waste will be removed from the site by licensed contractors in accordance with applicable regulatory requirements and disposed of at either local or regional approved facilities. No waste materials will be buried on site. All personnel will be instructed regarding the correct procedures for waste disposal. Notices stating these procedures will be posted in various areas.

The Project Manager (or designee) will be responsible for investigating spills and determining whether the reportable quantity (RQ) has been exceeded. Regulations defining the reportable quantity levels for oil and hazardous substances are found in 40 CFR Part 110, Part 117 or Part 302. Should a release occur during construction activities which exceeds the RQ, the following steps should be taken:

- Notify Local Emergency Response Agency at 911
- Notify the National Response Center immediately at 800-424-8802
- Notify Governor's office of Emergency Services Warning Center at 805-852-7550

A written description of the release should be submitted to the EPA Regional Office providing the date and circumstances of the release and the preventative measures taken to prevent further releases within 14 days of the spill.

5.4.5 Isolation of Potentially Hazardous Materials

A supply of drums will be available in the event of spills of known materials or if potentially hazardous materials are found during site excavation. The contaminated material will be placed in the drums, sealed and placed in a storage area to await proper characterization and disposal. The sealed drums will be placed in a lined roll-off container with a tarpaulin cover. In either case, the potentially hazardous material will be contained in a non-leaking container and maintained in a marked covered area that has secondary containment. In the event that a larger amount of material needs to be isolated, it will be placed into a lined roll-off box from a licensed hazardous waste transporter. The roll-off box will be placed out of the flow of construction traffic and equipment, in a bermed area to contain and isolate leaks and rainwater. In the unlikely event that even larger volumes of potentially hazardous material must be temporarily held awaiting disposition, a containment area will be constructed. Plastic sheeting will be placed on the ground prior to placement of the contaminated material and the material itself will be covered. A berm will surround the covered material to keep any rainwater from leaving the site.

6.0 Waste Management and Disposal

All wastes (including waste oil and other equipment maintenance waste) from the LECEF Phase 2 construction shall be disposed of in compliance with federal, state, and local laws, regulations, and ordinances.

7.0 SWPPP Administration

The Project Manager (or designee) will be identified in this SWPPP as the qualified person(s) assigned responsibility to ensure full compliance with the permit and implementation of all elements of the SWPPP, including the preparation of the annual compliance evaluation and the elimination of all unauthorized discharges.

The following lists required to be maintained as part of the SWPPP, will be maintained by the Project Manager:

- List of authorized contractors who have signed certifications that they understand and will comply with the SWPPP will be maintained, along with normal and emergency telephone number, address, specific area(s) of the contractor's responsibilities and the names of individuals responsible for implementation of the SWPPP (Attachment 4).
- As required by the RWQCB, the SWPPP will list the name and telephone number of the qualified person(s) who have been assigned responsibility for pre-storm, post-storm and storm event inspections (Attachment 5).
- The SWPPP and each amendment will be certified by the Project Manager (or authorized representative) and a list of Amendments will be maintained including the date first prepared, and the date of each amendment (Attachment 6).

8.0 Annual Review and Certification

Annually, the Project Manager (or authorized individual) will review performance under the SWPPP and certify that construction activities are in compliance with the requirements of the Storm water General Permit and the SWPPP. This Certification shall be based upon knowledge of construction activities and the site inspections by the General Permit. The certification must be completed by July 1 of each year, and maintained for period of at least three years. If necessary, amendments to the SWPPP will be prepared and submitted at this time.

9.0 Contractors/Subcontractors

The general construction contractor is **{To be determined}.** Portions of the work may be subcontracted to various specialty contractors. All subcontractors will be required to comply with the requirements of this permit.

10.0 Preparer

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel prepared the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for preparing the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

______________________________ ____________________________

Signed Position

____

Date

11.0 Copy Of Notice Of Intent

A copy of the Notice of Intent to obtain coverage under the State General Construction Activity Storm Water Permit is included in Appendix B.

12.0 Site Maps

A map showing the layout of the facility is presented in Attachment 1. Attachment 2 contains a storm water drainage plan for Phase 2. The Grading Plan in Attachment 3 shows the combined system of storm water ditches and storm drains around the site perimeter that convey non-process area runoff to a lift station.

Appendix A: Environmental Protection Procedures

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Storm water pollution prevention measures on and off site.

B. Related Sections:
   1. Section 01500 - Construction Facilities and Temporary Controls
   2. Section 02270 - Erosion Control
   3. Individual Sections: Equipment and Materials that may contain potential site pollutants.

1.2 REFERENCES

A. Federal Clean Water Act Amendments - 1987 and the National Pollutant Discharge Elimination System (NPDES). General Permit For Storm Water Discharges Associated With Construction Activity.

B. SWPPP - Storm Water Pollution Protection Plan for Los Esteros Critical Energy Facility Phase 2, prepared by CH2M HILL, 2485 Natomas Park Drive, Suite 600, Sacramento, California 95833.

C. California Storm Water Best Management Practice Handbook – Construction Activity. 2003. California Stormwater Quality Association (CASQA). January.

D. Caltrans Construction Site Best Management Practices (BMPs) Manual. March 2003.

E. California RWQCB Erosion and Sediment Control Field Manual, 1999.

F. Saliz Applied Earthcare Erosion Control standards. 2002

1.3 POTENTIAL POLLUTANT IDENTIFICATION

A. Potential pollutants that may be used at the site and that have the potential to enter the storm water drainage system are included in the list below.

TYPICAL CONSTRUCTION SITE POTENTIAL POLLUTANTS[2]

CATEGORY	PRODUCT	POLLUTANTS
Adhesives	Adhesives, Glues	Phenolics, Formaldehydes
	Resins, Epoxy Synthetics	Phenolics, Formaldehydes
	Calks, Sealers, Putty, Sealing Agents	Asbestos, Phenolics, Formaldehydes
	Coal Tars (Naptha, Pitch)	Benzene, phenols, Naphthalene
Cleaners	Polishes, (Metal, Ceramic, Tile)	Metals
	Etching Agents	Metals
	Cleaners, Ammonia, Lye, Caustic Sodas	Acidity/Alkalinity
	Bleaching Agents	Acidity/Alkalinity
	Chromate Salts	Chromium
Plumbing	Solder (Lead, Tin), Flux (Zinc Chloride)	Lead, Zinc, Tin
	Pipe Fitting (Cut Shavings)	Metals
	Galvanized Metals (Nails, Fences)	Zinc
Painting	Paint Thinner, Acetone, MEK, Stripper	VOCs
	Paints, Lacquers, Varnish, Enamels	Metals, Phenolics, Mineral Spirits
	Turpentine, Gum Spirit, Solvents	VOCs
	Sanding, Stripping	Metals
	Paints (Pigments), Dyes	Metals
Woods	Sawdust	BOD
	Particle Board Dusts (Formaldehyde)	Formaldehyde
	Treated Woods	Copper, Creosote
Masonry & Concrete	Dusts (Brick, Cement)	Acidity, Sediments
	Colored Chalks (Pigments)	Metals
	Concrete Curing Compounds	Metals
	Glazing Compounds	Asbestos
	Cleaning Surfaces	Acidity
Floors & Walls	Flashing	Copper, Aluminum
	Drywall	Dusts
	Tile Cutting (Ceramic Dusts)	Minerals
	Adhesives*	
Remodeling & Demolition*	Insulation	Asbestos
	Venting Systems	Aluminum, Zinc
	Dusts (Brick, Cement, Saw, Drywall)	

[2] This material list is generic and has not been revised for the LECEF project.

CATEGORY	PRODUCT	POLLUTANTS
Air Conditioning & Heating	Insulating	Freon
	Coolant Reservoirs	
	Adhesives*	
Yard O&M	Vehicle and Machinery Maintenance	Oils and grease, Coolants
	Gasoline, Oils, Additives	Benzene & Derivatives, Oils & Grease
	Marking Paints (Sprays)	Vinyl Chloride, Metals
	Grading, Earth Moving	
	Portable Toilets	Erosion (Sediments)
	Fire Hazard Control (Herbicides)	BOD, Disinfectants (Spills)
	Health and Safety	Herbicides
	Wash Waters* (Herbicides, Concrete, Oils, Greases)	Sodium Arsenite, Dinitro Compounds
		Rodenticides, Insecticides
Landscaping & Earthmoving	Planting, Plant Maintenance	Pesticides, Herbicides, Nutrients
	Excavation, Tilling	Erosion (Sediments)
	Masonry & Concrete*	
	Solid Wastes (Trees, Shrubs)	BOD
	Exposing Natural Lime or Other Mineral Deposits	Acidity/Alkalinity, Metals
	Soils Additives	Aluminum Sulfate, Sulfur
	Revegetation of Graded Areas	Fertilizers
Materials Storage	Waste Storage (Used Oils, Solvents, Etc.)	Spills, Leaks
	Hazardous Waste Containment	Spills, Leaks
	Raw Material Piles	Dusts, Sediments

* See above categories.

Note: VOC = Volatile Organic Compounds.
BOD = Biochemical Oxygen Demand.

References: USEPA, 1973. Processes, Procedures and Methods to Control Pollution Resulting From Construction Activity. Office of Air and Water Programs, EPA 430/9-73-007. October.

Meech, Mark L. and Margaret Lattin Bazany, 1991. Construction Creates Own Set of Hazardous Wastes. Hazmat. World August, 1991.

Gosselin, R.E., R.P. Smith, and H.C. Hodge, 1984. Clinical Toxicology of Commercial Products, Fifth Ed. Williams and Wilkins, Baltimore/London.

This is not intended to be a complete list of categories, products and pollutants. It is the Contractor's responsibility to identify the pollutants present during construction and take the necessary measures to restrict their entry into the natural drainage system, based on the NPDES applicable laws, codes and regulations.

1.4 SUBMITTALS

A. Submit under provisions of Division 1.

B. Implementation Drawings

1. Indicate the areas of the construction site for material delivery and storage of pesticides and herbicides, fertilizers, detergents, petroleum products such as fuel, oil and grease and other hazardous chemicals such as acids, lime, glues, paints, solvents, cleaning agents and curing compounds.

C. Quality Control Documentation

1. Hazardous Material Clean Up and Solid Water Management: List the employees trained in emergency spill cleanup procedures and indicate the training procedures for employees and subcontractors in spill prevention and cleanup and solid waste management.
2. Concrete Waste Management Data: Indicate concrete washout areas and the procedures to train employees and subcontractors in proper concrete waste management.
3. Vehicle and Equipment Fueling and Maintenance Data: Indicate fueling and maintenance areas and the procedures to train employees and subcontractors in proper fueling, clean up procedures, maintenance and spill cleanup.

1.5 PRECONSTRUCTION CONFERENCE

A. Attend a conference one week prior to commencing the work of this Section, under provisions of Division 1.

B. Require attendance of parties directly affecting the work of this Section.

C. Review all delivery routes, storage areas, clean up procedures and training procedures.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Keep an accurate, current inventory of materials containing potential pollutants, delivered and stored onsite.

B. Use personnel trained in emergency spill clean up procedures to unload and store materials containing potential pollutants.

C. Store all construction raw materials (including dry materials such as plaster and cement, pesticides and herbicides, paints, petroleum products, treated lumber) in designated areas with proper protection . Cover the materials with plastic tarps when not in used. Store materials such as petroleum products, powders, and paints on skids and not in contact with the ground.

D. Store hazardous chemicals such as acids, lime, glues, solvents, and curing compounds, detergents, fertilizers, pesticides and herbicides in sealed containers in designated areas of the construction site, away from waterways and drainage paths. Place in areas that will be paved and surround the areas with earth berms. Store reactive, ignitable, or flammable liquids in accordance with fire codes.

E. Store materials in a covered area during wet weather, if required. Store nonreactive materials such as detergents, oil, grease, and paints in secondary containment structures such as earthen dikes. Small amounts of material may be secondarily contained in "bus boy" trays or concrete mixing trays.

F. Store chemicals, drums, or bagged materials directly on pallets or skids away from ground in secondary containment structures. Store chemicals in their original labeled containers. Store hazardous material and wastes in covered containers and protect from vandalism.

G. Remove and dispose residual materials and contaminated soil after construction is complete.

1.7 SEQUENCING AND SCHEDULING

A. Sequence and schedule control maintenance, inspection and repair of controls as noted in Table 1.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 NON-STORM WATER MANAGEMENT

A. Minimize the use of water sprayed for dust control and irrigation, to avoid causing runoff and erosion.

B. Remove sediment from dewatering operations using sediment basins. Filter sediment from sediment traps and basins with a sump pit and perforated standpipe, wrapped in filter fabric or a floating suction hose.

C. Discharge water, used for flushing and disinfection, into onsite detention basins or temporary earthen basins.

3.2 CONCRETE WASTE MANAGEMENT

A. Wash out concrete trucks in approved areas only. Do not wash out concrete trucks into storm drains, open ditches, streets, or streams. Locate washout area at least 50 feet from storm drains, open ditches, or water bodies. Prevent runoff from this area by constructing a properly sized temporary pit or bermed area.

B. Wash out wastes into the temporary pit and allow the concrete to harden. Break the hardened concrete into pieces and dispose offsite.

C. Avoid washing recently poured concrete unless runoff will be drained to a bermed or level area, away from water ways and storm drain inlets.

D. Do not allow excess concrete to be dumped on-site, except in approved designated areas.

3.3 VEHICLE AND EQUIPMENT FUELING AND MAINTENANCE

A. Fuel vehicles and equipment at designated areas located away from drainage courses. Do not "top-off" fuel tanks.

B. Install stationary above ground storage tanks and dispense fuel in accordance with all federal, state and local requirements.

C. Install secondary containment devices such as drain pans or drop cloths at all fueling areas and use when removing or changing fluids.

D. Use personnel trained in emergency spill cleanup procedures to dispense fuel.

E. Regularly inspect onsite vehicles and equipment for leaks, and repair immediately. Do not allow leaking vehicles or equipment onsite.

F. Clean oil and grease build up from vehicles and equipment at approved designated areas located away from drainage courses.

G. Segregate and recycle wastes, such as greases, used oil or oil filters, anti-freeze, cleaning solutions, automotive batteries, hydraulic, and transmission fluids.

3.4 SPILL PREVENTION AND CONTROL

A. Place a stockpile of spill cleanup materials where it will be readily accessible.

B. Use personnel trained in emergency spill clean up procedures.

C. Clean up leaks and spills immediately, in accordance with waste management regulations.

D. Clean up spills on paved surfaces with minimal water usage. Clean small spills with cloths and larger spills with absorbent material. Immediately send used hazardous cleanup cloth material to a certified laundry (cloths) or remove and dispose as hazardous waste, in accordance with waste management regulations.

E. Do not hose down or bury dry material spills.

3.5 TEMPORARY CONTAINMENT REMOVAL

A. Remove all temporary containment structures, devices and equipment at completion of work. Clean and repair damage caused by installation and use of temporary containment structures.

Appendix B: Notice Of Intent (NOI)

Appendix C: BMP Specifications

The following pages are installation instructions and guidelines for specific BMPs. This section does not include all the identified BMPs, and it is recommended that the contractor update this portion as necessary.

Since a construction project is always changing, the contractor is responsible for implementing additional BMPs as required by the project.

Scheduling & Sequencing of Activities

Objective

The objective of proper scheduling of the construction project is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff and vehicle tracking. In order to meet this objective all project personnel will be required to follow good housekeeping practices, contain waste, minimize disturbed areas, stabilize disturbed areas, protect slopes, channels, drainage swales and ditches, control the site perimeter and control internal erosion measures.

Sequencing and Staging

Prior to start of earthwork operations the following erosion control and BMPs shall be installed and operational:

a) The entrances to the project will be well marked, and the Project Manager (PM) will ensure that all traffic entering the project be restricted to these areas.

b) A stabilized construction exit will be installed at the southwest corner of the LECEF fenceline (construction entrance). The PM will ensure that all traffic leaving the site will exit through this stabilized area. Signs will be posted throughout the project indicating the exit point. The concrete sediment collection box will be cleaned as necessary.

c) The laydown area will be constructed using 1″ to 3″ coarse aggregate gravel, 10″ thick. If necessary, appropriate geotextile material will be installed prior to the aggregate to further assist with stabilization and control of sediment from the laydown area.

d) All exposed perimeter of the project will be protected.

e) All storm water runoff will be controlled and contained as outlined in the designated sections of this SWPPP.

f) All paved areas that are exposed to vehicle tracking will be maintained on a daily basis. Approved maintenance procedures will be followed to keep sediment away from these areas. This will include, but not be limited to, street sweeping. All unpaved areas that have vehicular traffic will be watered or treated with an approved hydraulically applied material to keep dust and sediment loss at a minimum.

g) When possible, grading will be done during the dry season (May 1 through October 1).

h) Close and stabilize open trenches as soon as possible. Sequence trenching projects so that most open portions of the trench are closed before new trenching is begun.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

Construction Specifications:

- The aggregate size for construction of the gravel pad shall be 2-3 inch (51-76 mm) stone. Place the gravel to the specific grade and dimensions shown on the plans, and smooth it.
- The thickness of the pad shall not be less than 6 inches (0.2 m). Use geotextile fabrics, if necessary, to improve stability of the foundation in locations subject to seepage or high water table.
- The width of the pad shall not be less than the full width of all points of ingress or egress and in any case shall not be less than 12 feet (3.6 m) wide.
- The length of the pad shall be as required, but not less than 50 feet (15.2 m).
- Locate construction entrances and exits to limit sediment leaving the site and to provide for maximum utility by all construction vehicles. Avoid entrances which have steep grades and entrances at curves in public roads.
- The entrance shall be maintained in a condition that will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand, and repair and/or maintenance of any measures used to trap sediment.
- All sediment spilled, dropped, washed or tracked onto public rights-of-way shall be removed immediately.
- Provide drainage to carry water to a sediment trap or other suitable outlet.
- When necessary, wheels shall be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with crushed stone that drains into an approved sediment trap or sediment basin.
- All sediment shall be prevented from entering any storm drain, ditch or watercourse through use of sand bags, gravel, straw bales, or other approved methods.

Inspection and Maintenance:

- Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site.
- Replace gravel material when surface voids are visible.
- After each rainfall, inspect any structure used to trap sediment and clean it out as necessary.
- Immediately remove all objectionable materials spilled, washed, or tracked onto public roadways. Remove all sediment deposited on paved roadways within 24 hours.

Vehicle and Equipment Fueling

Objective

The primary objective of this BMP is to prevent fuel spills and leaks, and reduce their impacts to storm water by using off-site facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors.

Approach

These procedures are guidelines which are to be followed for the duration of this project. The Contractor understands that these represent minimum standards and will employ more extensive practices if necessary.

Standards

- Off-site fueling stations are to be used whenever possible. When fueling on-site, fueling will be done in a designated area away from downstream drainage and watercourses. All fueling must be performed on level-grade areas. The designated area shall be protected from storm water run-on and run-off.
- Absorbent spill clean-materials and spill kits shall be available in fueling areas and on fueling trucks and shall be disposed of properly after use.
- Drip pans or absorbent pads shall be used during vehicle and equipment fueling.
- Nozzles used in vehicle and equipment fueling shall be equipped with an automatic shut-off to control drips. Fueling operations shall not be left unattended. Fuel tanks shall not be topped off.
- Absorbent materials shall be used on small spills instead of hosing down or burying techniques.
- Protect fueling areas with berms and/or dikes to prevent run-on, run-off, and to contain spills.

ESC Monitor Responsibilities

The designated ESC site monitor for BMPs will include the following as part of worker awareness for the project, with specific emphasis on site staff and subcontractors:

- Provide education on vehicle and equipment fueling as required by this project;
- Make readily available the procedures for clean-up of leaks and spills and reporting criteria;
- Establish a continuing education program to indoctrinate new employees.

Maintenance Requirements

Designated ESC site monitor will insure that all site personnel are aware of the proper maintenance procedures, which include, but are not limited to, the following:

- Vehicles and equipment shall be inspected on each day of use for leaks. Leaks will be repaired immediately or problem vehicles and equipment will be removed from the site.
- Federal, state, and local requirements shall be observed for any stationary aboveground storage tanks.
- Fueling areas and storage tanks shall be inspected on a regular basis.
- An ample supply of spill cleanup material will be maintained on the site.
- Immediately cleanup spills and properly dispose of contaminated soil and cleanup materials.

More detail can be found in:

California Stormwater Best Management Practice Handbooks – Construction Activity, January 2003.

Caltrans Construction Site Best Management Practices (BMPs) Manual, March 2003.

Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995

Insert Illustration

Vehicle and Equipment Maintenance

Objectives

The objectives of this BMP are to prevent or reduce the discharge of pollutants to storm water from vehicle and equipment maintenance by running a "dry site." When feasible, off-site facilities should be used, performing work in designated areas only, providing cover for materials stored outside, checking for leaks and spills, containing and cleaning up spills immediately.

Approach

These procedures are guidelines which are to be followed for the duration of this project. The Contractor understands that these represent minimum standards and will employ more extensive practices if necessary.

Standards

- Keep vehicles and equipment clean of excessive build-up of oil and grease;
- Regularly inspect on-site vehicles and equipment for leaks, and repair immediately;
- Do not allow leaking vehicles or equipment on-site;
- If maintenance occurs on-site, designated areas will be located away from drainage courses to prevent run-on of storm water and run-off of contaminants and spills;
- Drip pans or absorbent pads shall be used during vehicle and equipment maintenance work that involves fluids;
- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices;
- Absorbent spill clean-up materials shall be available in maintenance areas and shall be disposed of properly after use and a stockpile of cleanup materials will be readily accessible;
- Properly dispose of used oil, fluids, lubricants and spill clean-up materials. Do not dump fuels and lubricants onto the ground. Do not place used oil in a dumpster or pour into a storm drain or watercourse.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic, and transmission fluids. Do not bury used tires. Properly dispose of used batteries.

ESC Monitor Responsibilities

The designated ESC site monitor for BMPs will include the following as part of worker awareness for the project, with specific emphasis on site staff and subcontractors:

- Provide education on vehicle and equipment maintenance as required by this project;
- Make readily available the procedures for clean-up of leaks and spills and reporting criteria;
- Establish a continuing education program to indoctrinate new employees.

Maintenance Requirements

Designated ESC site monitor will insure that all site personnel are aware of the proper maintenance procedures, which include, but are not limited to, the following:

- Maintain waste fluid containers in leak proof condition.
- Vehicle and equipment maintenance areas shall be inspected regularly.
- Vehicles and equipment shall be inspected on each day of use. Leaks shall be repaired immediately or the problem vehicles or equipment shall be removed from the project site.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

More detail can be found in:

California Stormwater Best Management Practice Handbooks – Construction Activity, January 2003.

Caltrans Construction Site Best Management Practices (BMPs) Manual, March 2003.

Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Insert Illustration

Sanitary and Septic Waste Management

Objectives

The primary objective is to prevent or reduce the discharge of pollutants to storm water from sanitary/septic waste devices by providing convenient, well-maintained devices, and arranging for regular service and disposal.

Approach

Sanitary/septic waste management practices are implemented on all construction sites that use temporary or portable sanitary/septic waste systems.

Installation Criteria

- These devices will be located away from drainage inlets, bio-swales, watercourses and traffic circulation.
- They will be placed on level ground and if necessary, have either sand bags or straw wattles surrounding the device to insure capture of waste discharge.
- When subjected to high winds or risk of high winds, devices will be secured to prevent overturning.
- Sanitary/septic devices will be maintained in good working order by a licensed service.
- Only reputable, licensed sanitary/septic waste haulers will be contracted.

Standards

- The designated ESC site monitor for BMPs will include the following as part of worker awareness for the project, with specific emphasis on site staff and subcontractors:
- Provide education on sanitary/septic waste storage and disposal procedures;
- Instruct personnel in identification of sanitary/septic waste and the potential dangers to the environment;
- Make available procedures for reporting overturned devices, visual leakage, or other obvious discharge;
- Establish a continuing education program to indoctrinate new employees.

Maintenance Requirements

The designated site ESC Monitor will do on-site inspections of all devices at least weekly during dry weather. Inspections will take place immediately after a rain event and at the time of high wind. All remedies to repair damaged or overturned devices will take place as soon as the problem is noted, and reporting of spills that may require sampling and analysis will follow the guidelines located in Section 3.3.6 of this SWPPP.

More detail can be found in:

California Stormwater Best Management Practice Handbooks – Construction Activity, January 2003.

Caltrans Construction Site Best Management Practices (BMPs) Manual, March 2003.

Sand Bag Barriers

Objective

Stacking sand bags along a level contour creates a barrier which detains sediment-laden water, ponding water upstream of the barrier and promoting sedimentation. The primary objective when using this device is to protect slopes, channels, site perimeter and control internal erosion.

Applications

For the purpose of this project, suitable applications for this device are:

- Along the perimeter of the site;
- Across swales with small catchments;
- Diversion dike or berm;
- Create a temporary sediment trap;
- Around temporary spoil areas.

Installation Criteria

Sand bag barriers provide a semi-permeable barrier in potentially wet areas, are more permanent than silt fences or straw bales, and allow for easy relocation on site to meet changing needs during construction.

- May be used in drainage areas up to 5 acres;
- Must be installed along a level contour;
- Base of the sand bag barrier should be at least 48" wide;
- Height of the sand bag barrier should be 18 " maximum in non-traffic areas and 12" maximum in construction traffic areas
- Place near the toe of the slope

Maintenance Requirements

Barriers are to be checked prior to forecast rain, daily during extended rain events, after each rain, weekly during the rainy season and at two-week intervals during the non-rainy season. They are to be reshaped or replaced if damaged. All sediment is to be removed when it reaches a depth of one third of the barrier height.

More detail can be found in:

California Stormwater Best Management Practice Handbooks – Construction Activity, January 2003.

Drop Inlet Sediment Barriers

Objective

The objective of this BMP is to minimize and/or eliminate sediment-laden runoff from entering storm drain inlets during the construction period.

Gravel Doughnut:

- Keep the stone slope toward the inlet at 3:1 or flatter or use concrete blocks to help prevent the stone from being washed into the drop inlet. A minimum 1 foot (0.3 m) wide level area set 4 inches (101 mm) below the drop inlet crest will add further protection against the entrance of material.
- Stone on the slope toward the inlet should be 3 inches (76 mm) or larger for stability, and 1 inch (25 mm) or smaller on the slope away from the inlet to control flow rate.
- Wire mesh with 2 inch (51 mm) openings may be placed over the drain grating, but must be inspected frequently to avoid blockage by trash. If concrete blocks are used the openings should be covered with wire screen or filter fabric.

Inspection and Maintenance:

- Inspect the barrier after each rain and promptly make repairs as needed.
- Sediment shall be removed after each significant storm (1 inch (25 mm) in 24 hours) to provide adequate storage volume for the next rain.
- The removed sediment shall be deposited in an area that will not contribute sediment off-site and can be permanently stabilized.
- For gravel filters: If the gravel becomes clogged with sediment it must be carefully removed from the inlet and either cleaned or replaced.

Silt Mat

- Clear and level area (6′ x 8′ min) surrounding field inlet
- Roll out mat and center riser over inlet area
- Install wire mesh frame into riser
- Secure mat in place using staple (6″ x 1″ x 6″ min) at approximately 1′ on center
- Side of erosion control blanket may be rolled to form check dam to further slow or direct flows. Stake in place.
- Inspect inlet protection device before and after rain events, and weekly throughout the rainy season. During extended rain events, inspect at least once every 24 hours.
- Remove and properly dispose of accumulated silt and debris to allow for proper function of device.

Insert Illustration

Dust Control

Objective

The primary objectives of this BMP are to maintain good housekeeping practices, minimize disturbed areas, stabilize disturbed areas and control site perimeters. Dust control is used to stabilize soil from wind erosion and reduce dust generated by construction activities.

Application

Suitable applications for this BMP are:

- Clearing and grading activities
- Construction vehicle traffic on unpaved roads
- Sediment tracking onto paved roads
- Soil and debris storage stockpiles
- Areas with unstabilized soil

Installation Criteria

- Dust control can be managed with water spraying, or hydraulically applied dust suppressants. If water is used for dust control, it must be applied in a manner that will not permit run-off or erosion.
- Only applicators that are familiar with chemical and polymer products should be permitted to apply these materials. Improper application can cause non-visible pollutants to enter the storm water system.
- Application should be applied prior to anticipated wind events. Minimize the impact of dust by anticipating the direction of prevailing winds.

Maintenance Requirements

Watering requires frequent application, often several times a day.

Polymers, and equivalents, have a longer life than water, but still need to be monitored for reapplication when necessary. These types of applications are effective for areas that will not be disturbed daily, such as pads that will have foundations. These are also effective in controlling dust and sediment from soil stockpiles.

More detail can be found in:

California Stormwater Best Management Practice Handbooks – Construction Activity, January 2003.

Caltrans Construction Site Best Management Practices (BMPs) Manual, March 2003.

USDA Soil Conservation Service, "Guides for Erosion and Sediment Control."

Straw Wattles

Objective

The primary objective of this BMP is to control loss of sediment from the site. These devices will be installed at all designated perimeters (site, trenches, etc).

Approach

These procedures are guidelines which are to be followed for the duration of this project. The Contractor understands that these represent minimum standards and will employ more extensive practices if necessary.

Installation Criteria

Straw wattles specified for this project are 9" and 20". 20" wattle will be used in place of straw bales. Straw wattles are used to control loss of sediment from the site. Contractor is to install straw wattles wherever sediment loss will be of concern, and where storm water discharge will move sediment from the site.

Follow manufacturer's recommendations for installation, as well as:

- Fine grade the subgrade where necessary to remove local deviations and to remove larger stones or debris that will inhibit intimate contact of the fiber roll with the subgrade.
- Prior to installation, contour a concave key trench 2" to 4" deep along the proposed installation route.
- Soil excavated in trenching should be placed on the uphill side or flow side of the roll to prevent water from undercutting the roll.
- Place wattle into the key trench and stake on both sides of the roll within 6 inches of each end and every 4 feet on center with a minimum of 1"x2"x24" or "2x2"x36" (20" wattle) stakes.
- Drive stakes on alternating sides of roll. When placed in continuous row, rolls should be overlapped, not abutted.

Maintenance Requirements

Wattles will be removed each day prior to start of work from any perimeter area where vehicle traffic will cross the device. The wattles will be replaced at the end of each work day, during rainy season, or when there is an indication of rain during the non-work time.

ESC Monitor will inspect installed wattles daily to determine if repairs are necessary. Designated personnel will be instructed to repair or replace split, torn, unraveling or slumping wattles immediately.

Sufficient wattles will be stored on-site for ready replacement for the duration of construction.

Wattles that are not damaged, and can be used in other areas of the project, as the project progresses will be moved and reinstalled, as needed.

Unless designated to be left in place, wattles and stakes will be removed from the site upon final stabilization of the project site.

Straw Wattle Specifications

Straw Wattle Properties Certification

The Straw Wattles are to have the following minimum physical properties and test values.

Application & Design Information Table

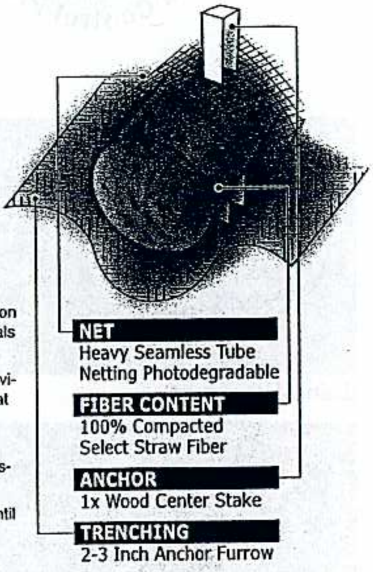
PERFORMANCE PROPERTY	VALUE
BMP Device Type	9" Wattle
Sediment Retention Capacity (Lbs/lft)	30
Destabilizing Moisture Retention (%) [1]	11**
Functional Capacity Duration (Minutes) [1]	350***
PHYSICAL PROPERTY	
Unit Weight (Lbs/lft)	1.6
Functional Longevity (Months)	24
Installed Free Board Height (Inches)	7
University Laboratory Tested	Yes
Additional On Site Rolling Required	No
Manufactured Ready To Use (RTU)	Yes
Seamless Construction	Yes
Best Available Technology (CWA)	Yes

1 Functional capacity was determined by application of consecutive 10-year storms at 24-hour intervals (No overtopping occurred).

* Clean Water Act (CWA) Sections 301 & 402 provisions require controls of pollutant discharges that utilize best available technology.

** Certain soil types have a tendency to become destabilized by a concentrated high level of moisture retention (Super Saturation).

*** Minutes of elapsed time - rainfall was applied until sediment-laden water over-topped the device (Functional Capacity Breached).

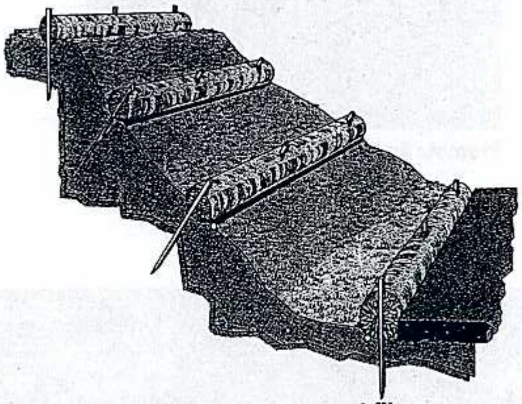


The Straw Wattle to meet the following requirements:

1. Erosion control and Sediment Retention Wattles (ESW) or Slope Interruption Devices (SID) commonly known as Wattles, are elongated tubes of compacted straw and/or other fibers that are installed along contours or at the base of slopes to help reduce soil erosion and retain sediment. They function by shortening slope length, reducing runoff water velocity, trapping dislodged soil particles and ameliorating the effects of slope steepness. Wattles are used as water flow dissipaters, trapping sediment when located prior to Drain Inlets (D.I.)'s, etc. Wattles are highly effective when they are used in combination with other surface soil erosion/re–vegetation practices such as surface roughening, straw mulching, erosion control blankets, hydraulic mulching and application of bonded fiber matrix or other hydraulic soil stabilizers.
2. The Wattle shall be a straw-filled tube of flexible netting material exhibiting the following properties. It shall be a machine-produced tube of compacted rice straw that is Certified Weed Free Forage under California Food & Agriculture Code Sec. 5101-5205, by a manufacturer whose principal business is wattle manufacturing. The netting shall consist of seamless, high-density polyethylene and ethyl vinyl acetate and contain ultra-violet inhibitors.
3. Wattles to be an Earth Savers™ Wattle, manufactured using R.H Dyck Inc. patented process.

Testing And Properties

Parameter	Test Method	Units	Min. Value
Mass per Unit Weight	Field Measured	(Lbs/ft)	1.6
Dimension	Field Measured	(Dia/inches)	8.0-9.0
Net Strand Thickness	Field Measured	(Inches)	0.030
Net Knot Thickness	Field Measured	(Inches)	0.055
Netting Unit Weight	Certified	(Ounces/ft)	0.35
Sediment Retention Capacity	Rainfall Sim.	(Lbs/ft)	30
Installed Free-Board Ht.	Field Measured	(Height/inches)	7.0
Fiber Content	Certified	%	100
Soil Loss	Rainfall Sim	% Effectiveness	58



This specification does not apply to other types of straw logs or fiber rolls such as rolled erosion control straw or wood fiber blankets rolled up to create an imitation wattle type device.

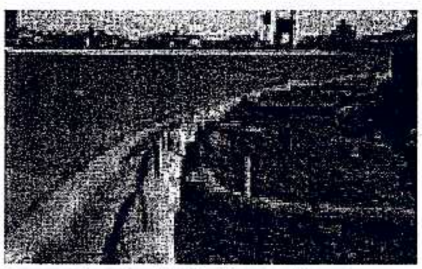
Erosion Control Products

Earth Saver™ Rice Straw Wattles

New 20" diameter

Reduce Slope Length

Capture Inlet Sediment



Prevent Construction Sedimentation

Promote Revegetation

Earth Saver™, the inventor of the Rice Straw Wattle, has the *only successfully tested* wattle in the industry. The newest test results are in — and the findings are phenomenal!

San Diego State University's Soil Erosion Research Laboratory conducted in-depth testing on Earth Saver Rice Straw Wattles. Scientists found that the Earth Saver Wattles dramatically ***reduce downslope sediment delivery — by 58 percent for the 9" diameter wattles, and by 74 percent for the new 20" wattles.*** In fact, the ***20" wattle has proved to reduce sediment delivery by 84% after three consecutive rainfall events.*** The laboratory's Rainfall Simulator Testing also demonstrated that Earth Saver wattles reduce runoff water velocities and release water at a steady rate. Wherever bare soil is exposed to erosion, Earth Saver Rice Straw Wattles can be an important part of a comprehensive ***Best Management Practice*** system for soil stabilization, sediment retention and vegetation establishment.

Earth Saver Rice Straw Wattles — the industry standard.

- **9" x 25', 12" x 10' and *new 20" x 8' straw wattles***
- ***20" straw wattles replace straw bales in swales***
- ***20" straw wattles replace silt fence baffles in sedimentation ponds***
- **Photodegradable, biodegradable and burlap nettings**
- **Available certified 100 percent weed free**
- **Easy shipping and storage on shrinkwrapped pallets**
- **Large inventory of raw and finished product**

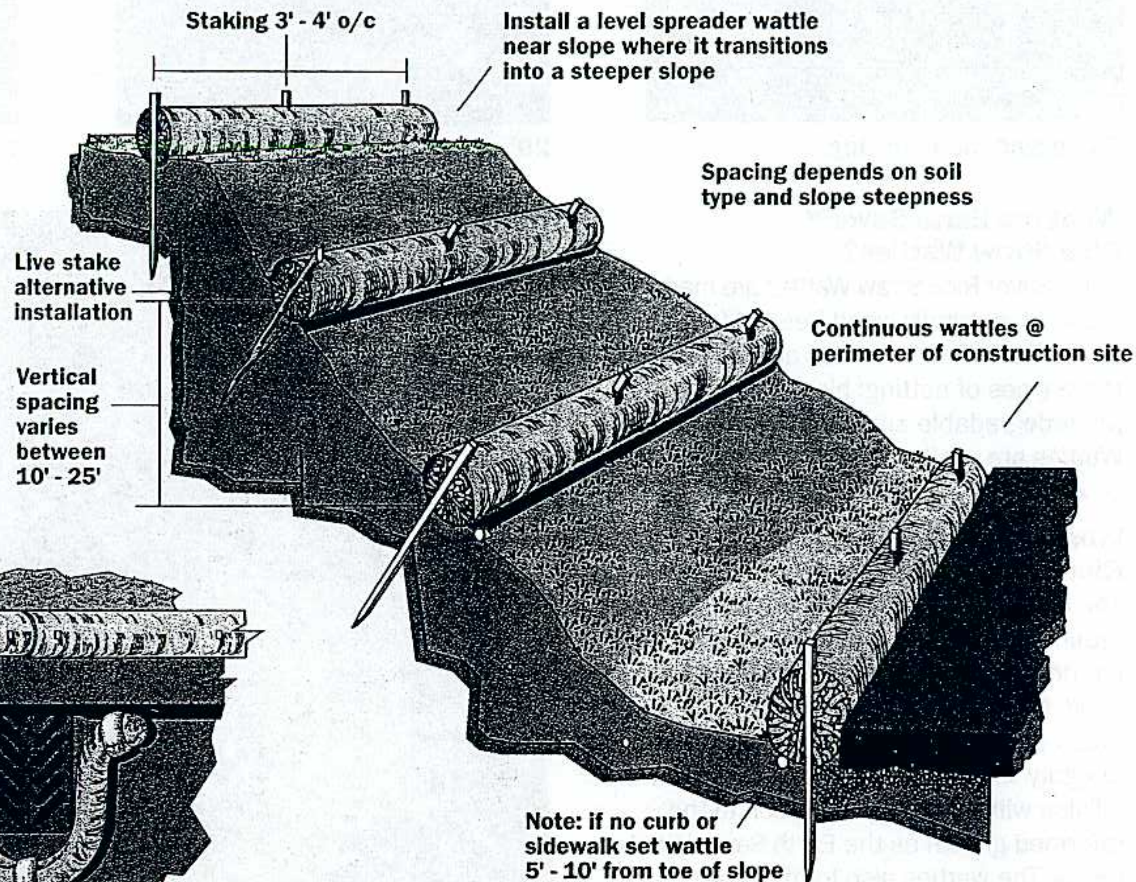
Check out our redesigned Web Site
for downloadable specifications, full test results, and more information on Earth Saver products, including the new, versatile 20" wattle!
www.earth-sayers.com

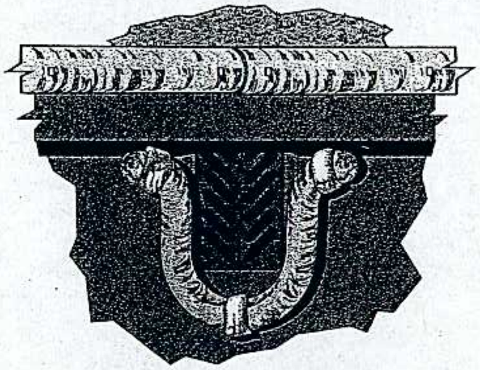
R.H. Dyck, Inc.,
P.O. Box 665
6862 Jaybee Lane
Winters CA 95694

Tel: 530-795-4751
Fax: 530-795-3972
1-866-WATTLES

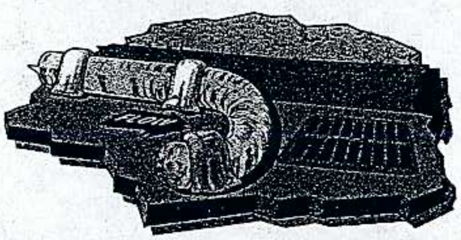
U. S. Patent # 5,519,985

Wattle Installation Diagrams

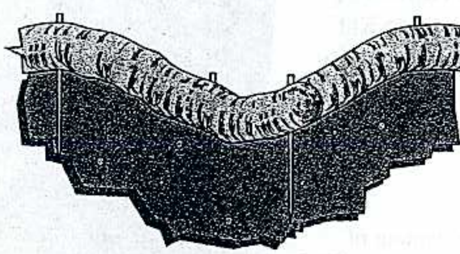




Paved D. I. Typical

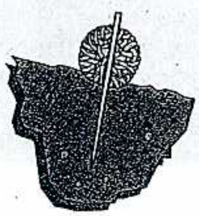


Paved D.I. (Alt. Steep Slope)



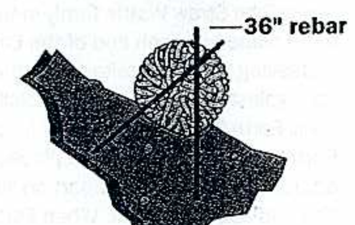
Typical Check Dam Application

Stock Pile Containment



Typical 9-inch Center Staking

Alt. 9", 12" & 20" No Furrow - Rope Restraint



Typical 20-inch Staking

R.H. Dyck, Inc.
P.O. Box 665
4862 Jay Bee Lane
Winters, Ca 95694
Tel: 530-795-4751
Fax: 530-795-3972

EARTH SAVER™ Erosion Control Products

1-866-WATTLES
www.earth-savers.com

U.S. Patent # 5,519,985

Emerald Member - IECA

Biodegradeable netting

20" wattle in a swale

Unloading 9" wattles

What are Earth Saver™ Rice Straw Wattles?

Earth Saver Rice Straw Wattles are made from recycled, naturally weed-free California rice straw. Earth Saver Wattles are available in three types of netting: biodegradable, photodegradable and burlap. Earth Saver Wattles are available in three standard sizes: 9" x 25', 12" x 10' and 20" x 8'.

What do Earth Saver Rice Straw Wattles do?

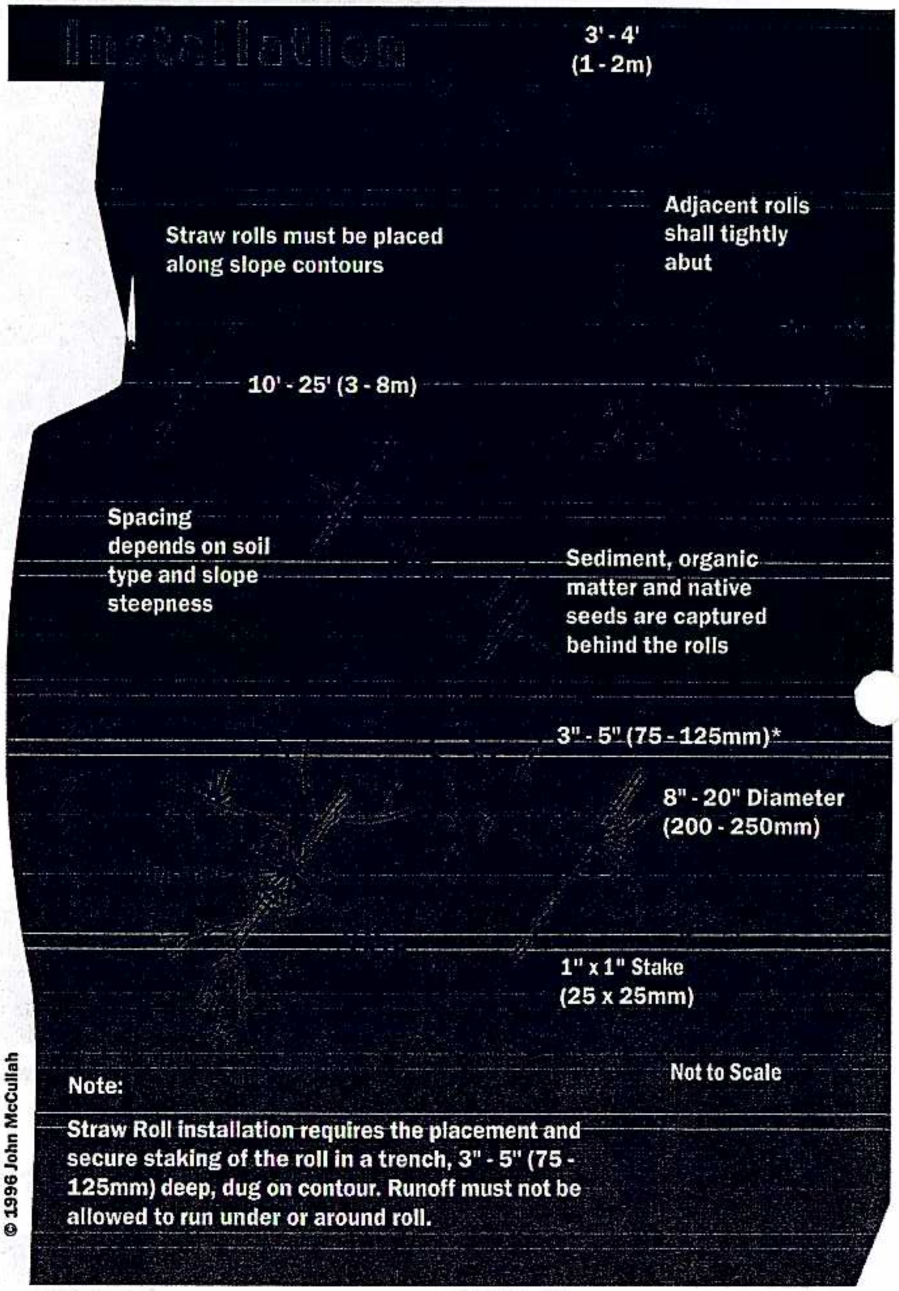
The wattles imitate natural stabilization by reducing rate of flow, absorbing water and filtering sediment runoff. By trapping silt and seed, the wattles allow native vegetation and brush to begin to revegetate and restore root integrity within one year. Stabilization of the hillside will eventually transition to the reformed growth as the Earth Saver Wattles decay. The wattles also form a durable containment area to prevent polluted runoff from reaching surface waters.

What do Earth Saver Wattles replace?

Earth Saver Rice Straw Wattles replace Silt Fences, Sandbags, Willow Wattles, and Straw Bales with a natural, earth-friendly, weed-free solution.

Installation of Earth Saver Rice Straw Wattles*

Stake Earth Saver Rice Straw Wattles to contour of slope in a 2" to 5" trench. For sandy soils, dig a 3" to 5" trench. For dense soils, dig a 2" to 3" trench. Place Earth Saver Rice Straw Wattle firmly in the trench. Stakes are to be placed at each end of the Earth Saver and every 4', leaving 2" of the stake above the Earth Saver. Pack soil against the wattles on the uphill side. For continuous rows, Earth Saver should be firmly butted, not overlapped. Earth Saver rows should be placed horizontally, approximately 6' to 20' apart on slope, depending on site and soil conditions. When Earth Saver is used on flat ground, drive stakes in vertically; when used on slopes, drive the stakes at an angle towards the uphill side of the slope. Closer spacing is needed to catch sediment for sandy soil and high rainfall. Wider spacing is needed for heavy soil, low rainfall and low sediment loads.



Distributed by:

08/01

Temporary Drains and Swales

Objectives

Temporary drains and swales are used to divert off-site runoff around the construction site, and divert runoff from stabilized areas around disturbed areas. The primary objectives of this practice are to protect slopes and channels, control site perimeter and to control internal erosion. The targeted pollutant to be controlled is sediment.

Installation and Application Criteria

Temporary drainage swales can effectively convey runoff and avoid erosion:

- Size temporary drainage swales using local drainage design criteria.
- At a minimum, the swales should conform to predevelopment drainage patterns and capacities.
- The constructed swale will have an uninterrupted, positive grade draining to a stabilized outlet.
- Erosion protection and/or energy dissipaters will be provided if the flow out of the drain or swale can reach an erosive velocity.

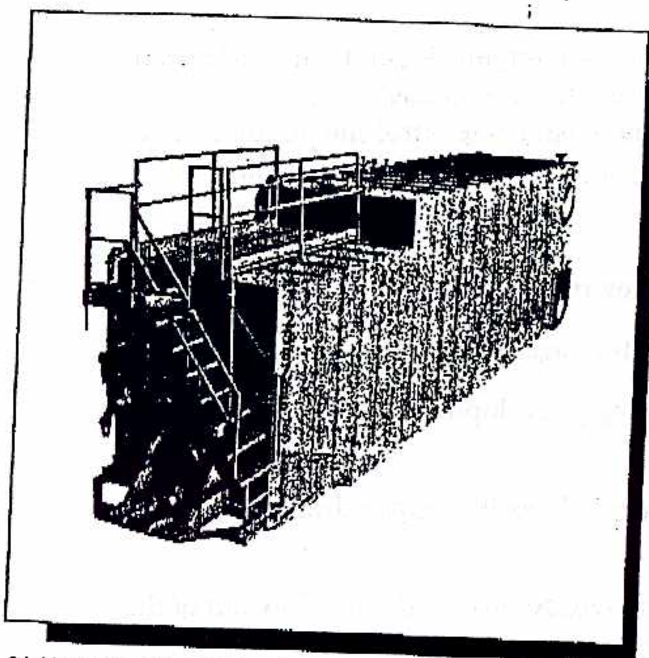
Maintenance

Temporary swales must be inspected weekly and after each rain event. Repair any erosion immediately and remove sediment which builds up in the swale and restricts its flow capacity.

More detail can be found in:

California Stormwater Best Management Practice Handbooks – Construction Activity, January 2003.

STEEL TANKS



21,000 Gallon Steel Bi-Level Tank

21,000 GALLON BI-LEVEL TANK

EPOXY COATED OR CARBON STEEL

FEATURES

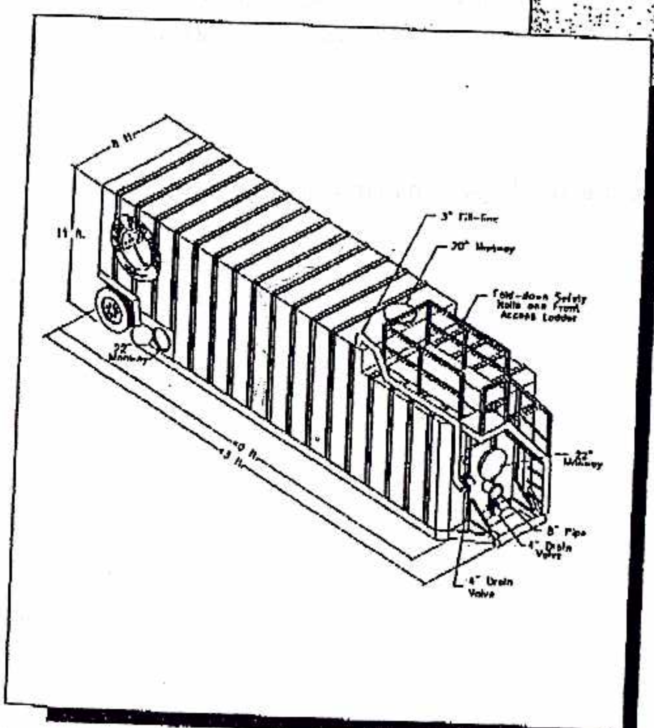
- Unique safety stairway
- Totally enclosed tank
- Complete guard rail system
- Quick Kleen "V" shaped floor with two 4" valves at floor level
- Easy to move
- Optional vapor tight features with liquid level gauge
- Optional steam coils

TECHNICAL

WORKSAFE™ Bi-Level steel tanks are available with or without and epoxy coated interior. This tank has a "V" shaped Quick Kleen floor which allows any residual fluid in the tank to be easily flushed out the floor level 4" valves. Staircase guard rails and three 22" confined space entry hatches are standard equipment. Optional epoxy coatings offer increased chemical resistance and higher degree of cleanliness for sensitive environmental applications. (Chemical resistance charts are available.)

MATERIAL SPECIFICATIONS

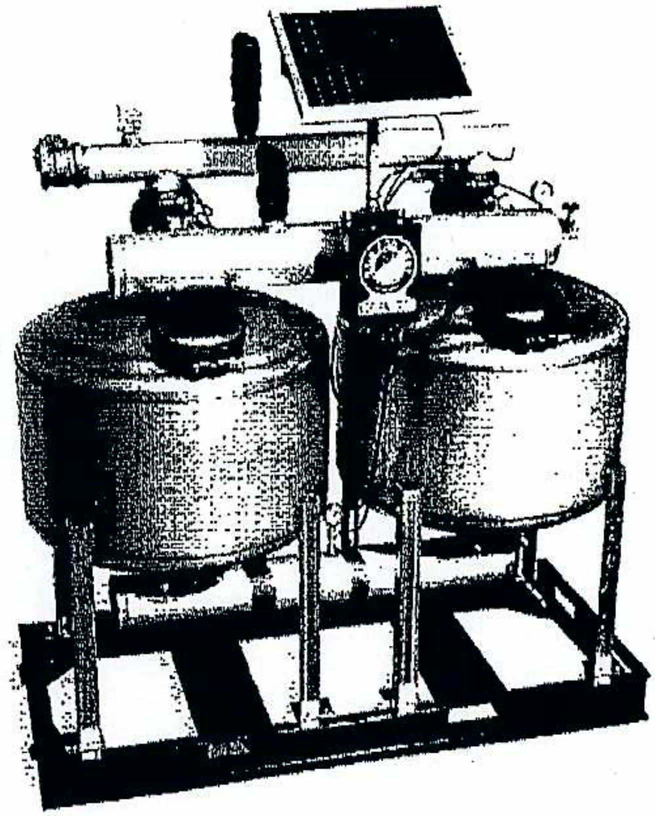
Steel construction, totally enclosed, cross style internal bracing and optional internal two part epoxy coating. Two 4" butterfly valves located at either end of the "V" shaped floor. Permanently attached axles for maximum maneuverability. Staircase attached to the front and a guard rail system on the roof of the tank. Optional Varec level gauge and vacuum pressure relief valve. Optional vapor recovery fitting. Three 22" vapor tight access hatches. Weight is 21,000 lbs.



Tank Dimensions

RAIN FOR RENT
Postal Box 2248 • Bakersfield CA 93303
800 742-7246 • 805 399-9124 • FAX 805 393-1542
Internet: www.rainforrent.com

SAND MEDIA PARTICULATE FILTER



MODEL 36-2 SSK

- MAX 325/ MIN 280 GPM
- 100 PSI MAX

TECHNICAL

- Units consist of two 36" filter tanks
- Units fitted with air vents and pressure gauges
- Tanks provide 14.2 square feet of filtration area
- Inlet and outlet manifold connections are 6" victaulic
- Backwash manifold connection is 4" fipt
- 8" media loading ports
- 4" media removal ports
- Dry weight is 1300lbs.
- 100psig working pressure
- 400lbs - of gravel per tank
- 800lbs - of sand per tank
- Most effective backwash rate is 107GPM min

FEATURES

- Filter tanks are constructed out of 304 stainless steel
- Skid is constructed out of carbon steel with integral forklift slots
- Stainless steel inlet, outlet and backwash manifolds
- Units are corrosion resistant
- Solar and DC powered automatic filter backwash controller that allows for timed, pressure differential or manual backwash intervals
- Unit is equipped with continuous acting air vents
- System can stand alone or be used in combination with additional filtration equipment

AVAILABLE ACCESSORIES

- Power Prime Pumps
- Spill Guard Containment berms
- Stainless steel 304 and Carbon Steel storage tanks in Bi Level, Mixer, Weir and Frac configurations
- Polyethylene storage tanks
- Cartridge and bag filters
- Roll off boxes, dewatering bins and vacuum boxes
- Flow meters and pressure reducing/ sustaining valves
- Aluminum victaulic pipe and fittings

RAIN FOR RENT

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800 742-7246 • 661 399-9124 • FAX 661 393-1542

Internet: www.rainforrent.com

Appendix D: Sampling and Analysis of Non-Visible Pollutants

Los Esteros Critical Energy Facility

San Jose, California

IN COMPLIANCE
WITH RECENT MODIFICATIONS
OF THE STATE GENERAL PERMIT
FOR STORM WATER DISCHARGES FROM
CONSTRUCTION ACTIVITY
(RESOLUTION NO. 2001-046)

SAMPLING AND ANALYSIS
BACKGROUND INFORMATION:

On April 26, 2001, the State Water Resources Control Board under a court order modified the provisions of the General Permit. These changes require permittees to implement specific sampling and analytical procedures to determine whether Best Management Practices implemented on the construction sites are: 1) preventing further impact by sediment in the storm water runoff discharged directly into waters listed as impaired for sediment or silt; 2) preventing other non-visible pollutants that are known to exist on site and, if discharged in storm water, may result in exceedances of water quality standards from coming into contact with storm water.

This represents the contingency plan for sampling and analytical procedures for the LECEF construction project. This plan also includes a sampling schedule for both sediment in runoff which **discharges directly into impaired water bodies listed on Attachment 3** (if applicable), and **non-visible pollutants** discovered during visual inspections to be exposed to storm water and potentially discharged with it.

I. SEDIMENTATION/SILTATION

None of the storm water emanating from this project discharges directly into a water body listed in Attachment 3 of the General Construction Permit. Therefore, this amended SWPPP does not include sampling procedures for the sediment/siltation or turbidity in the storm water discharge and is not subject to these sampling and analyses requirements. Storm water runoff from this construction site flows into the Local Municipal Separate Storm Water System (MS4).

II NON-VISIBLE POLLUTANTS

A. Source Identification

Pursuant to sections A.5.b (2), (3) and (4) and section A.5.c. (l) And (2), potential pollutants located on this site, or activities that generate non-storm water discharges that may come in contact with the runoff due to poor housekeeping and could affect or exceed a water quality objective include:

a) runoff with elevated pH from contact with soil amendments such as lime, gypsum, or fly ash scheduled to be applied during the rainy season should unworkable saturated conditions occur;
b) washing of exposed aggregate concrete during home driveway construction;
c) concrete rinse water;
d) equipment washing operations scheduled to take place during grubbing and grading operations;
e) fuel and construction material storage areas;
f) washing of portable toilet and/or spillage or leaks, etc.
g) concrete saw cutting operation;
h) sealing and paving activities;
i) fertilizers applied by landscaping contractors and/or as part of hydroseeding operations.

Consult the following table (Table 1) for field indicator parameters, field tests, and laboratory tests to be employed for the listed construction materials:

TABLE 1

Construction Material	Visual Observations	Field Test	Laboratory Test
Inert Materials – Sand, gravel, uncontaminated soil, etc.	Cloudiness, turbidity	Turbidity – Turbidity meter	Same
Concrete – Concrete, mortar, cement, etc.	Cloudiness, turbidity	pH – pH of 9.5 or higher indicates presence of material	pH, calcium, alkalinity
Asphalt – Asphalt, asphalt emulsion, liquid asphalt, etc.	Rainbow surface sheen, odor		Oil & grease or Total petroleum hydrocarbons
Petroleum products – diesel fuel, bunker oil, lubricants, fuels, solvents, etc.	Same as above		Same or analysis for particular substance
Paints (see above for solvents, thinners)	Paint color for water soluble paints, surface sheens for water insoluble paints	None	None
Brick etching and acid washing	None	pH – pH of 4 or lower indicates presence of material	pH
Chlorine and chlorine bleach products Detergents	Smell of chlorine Foaming	Chlorine test kit, e.g. pool test kit	Chlorine residual
Herbicides, pesticides	None	There are ELISA kits for individual pesticides/herbicides, but require much work to assure reliable results	Test for specific pesticide or herbicide
Fertilizers	None	Field kits for phosphate and nitrate	Ortho phosphate, total phosphorous, nitrate, ammonia, total nitrogen (Kjeldahl nitrogen)
Salts – dust palliatives	None	Electrical conductivity	Same and tests for one of the ions, e.g. sodium, magnesium, calcium, chloride, etc.

Examples of when sample will be required are:

Samples *will* be taken when visual inspection indicates that there has been:

1) a breach;
2) malfunction;
3) leakage or spill from installed BMPs;
4) on-site storage materials areas which result in discharge with runoff; when storm water runoff comes in contact with exposed stored materials or spilled materials and is allowed to be discharged; and
5) contact of storm water with soluble or uncured soil amendments.

Examples of when samples will not be required are:

1) All construction materials are stored under a watertight roof or inside a portable container (***No Exposure***).
2) All stockpiled materials are covered with plastic and surrounded by a berm.
3) Spilled materials are cleaned up immediately and disposed of at an approved site, or contained in a watertight container or inside a building.

Miscellaneous sampling

The following *Pollutants of Concern* will be collected for laboratory analysis if observed in the storm water runoff during inspection(s):

a) Total Suspended Solids (TSS)/Turbidity;
b) Oil and Grease (O&G);
c) Total Petroleum Hydrocarbons (TPH) as a result of sheen noted in the runoff;
d) Total Organic Carbon (TOC); and
e) Total Coliform due leakage/washing or spillage of portable toilet.

Sampling Locations:

Based on the Pollutants of Concern identified above, the trained staff or contractor <u>will test near a storm drain, down- gradient from the *area or at a location where the polluted storm water exits the site,*</u> that was identified by visual observation where potential pollutants were **present or detected** in the storm water.

In addition, a sample (**<u>control sample</u>**) will also be collected in an undisturbed area or an area where storm water has not come in contact with any stored construction materials for comparison with the potential pollutant sample. The samples will be analyzed both in the field for indicator parameters and through laboratory analysis, if warranted.

Approximate locations of sampling points for both the control and polluted runoff samples will be indicated on the site map. The sampling locations (excluding control point) will change as each plan or area is completed and stabilized.

Sampling Procedures and Analysis

Samples will be taken during the **first two hours** of discharge when the discharge occurs in daylight business hours. For laboratory analysis, all sampling, sample preservation, and analyses will be conducted according to test procedures per 40 CFR Part 136 and/or in accordance with Method 1060 of Standard Methods for the Examination of Water and Waste Water 20th Ed.

Field samples will consist of grab samples with appropriate sampling devices obtained from local certified laboratory, such as clean sample bottles. The grab samples will be analyzed according to the specifications of the manufacturer of the sampling meter used on the field. All field/portable meters will be calibrated according to manufacturer specifications prior to sampling.

Staff assigned to sampling will be trained to collect samples both for field and laboratory analyses, and to perform field tests. Mobilization of sampling will be initiated at least 72 hours prior to any predictable rain events.

STORAGE OF SAMPLING EQUIPMENTS

A supply of sampling equipment, materials, field calibration solutions, and containers will be maintained at the site superintendent office or on-site trailer until termination of the project.

All field and/or laboratory analytical data will be kept with the SWPPP document, which will remain at the site at all times until completion of the project. An example of a reporting document for field and laboratory analysis results is shown in Table 1.

CORRECTIVE MEASURES AND NOTIFICATION

Per the general NPDES permit for construction, should the sampling program indicate presence of pollutants that may affect or exceed the water quality objectives, the site superintendent or a designated staff member will immediately initiate corrective measures to find the source, eliminate and/or control it. For this site, corrective measures *(at a minimum)* will include:

1) Divert any pH contaminated storm water (see Table 1) from contact with soil amendments into the detention basin and holding the water. The MSDS sheet will indicate if the material has other potential contaminates. The detained water will then be tested for such contaminates prior to release. Use filtration during dewatering the basin.
2) If testing indicates that washing waters of exposed aggregate concrete, concrete rinse waters, and water from equipment washing

operations are coming in contact with storm water, (see Table 1 for pH, oil and grease, and detergents), these waters will need to be discharged to a bermed holding or infiltration area during rain events (see proposed location on site map). The perimeter of this area will be surrounded by fiber rolls fitted with absorbent or lipophilic material.

3) Berms around fuel and construction material storage areas may need to be increased in height and width, depending upon rainfall amounts. Consider the perimeter controls as cited above.
4) Portable toilets must be relocated or bermed if spills, leaks or cleaning activities contaminate storm water or D.I.s.
5) See Table 1 for sampling parameters for fertilizers. Apply fertilizers during dry season, if possible or during early part of rainy season to allow for maximum infiltration and uptake.

In the instances where contaminated discharges may cause or contribute to exceedances of water quality standards in the receiving waters, the Regional Board will be notified by telephone as soon as possible, but no later than 48 hours.
This notification will be followed by a written report within 14 calendar days, unless or otherwise directed by the Regional Board, describing source of pollutants, and action taken to correct or reduce pollutants to extent feasible with time schedule, if necessary.

In summary, the site superintendent will make every effort to abate or minimize contact of any materials stored or spilled at the site. All contractors and subcontractors will be trained on proper materials handling, and spill cleanup with notification.

STORM WATER DISCHARGE ANALYSIS AND RESULTS

Sampling reports will be prepared and documented as shown in Table 1 below. The report will also include storm event information, record of any corrective actions, follow up activities and laboratory QA/QC.

Table 1

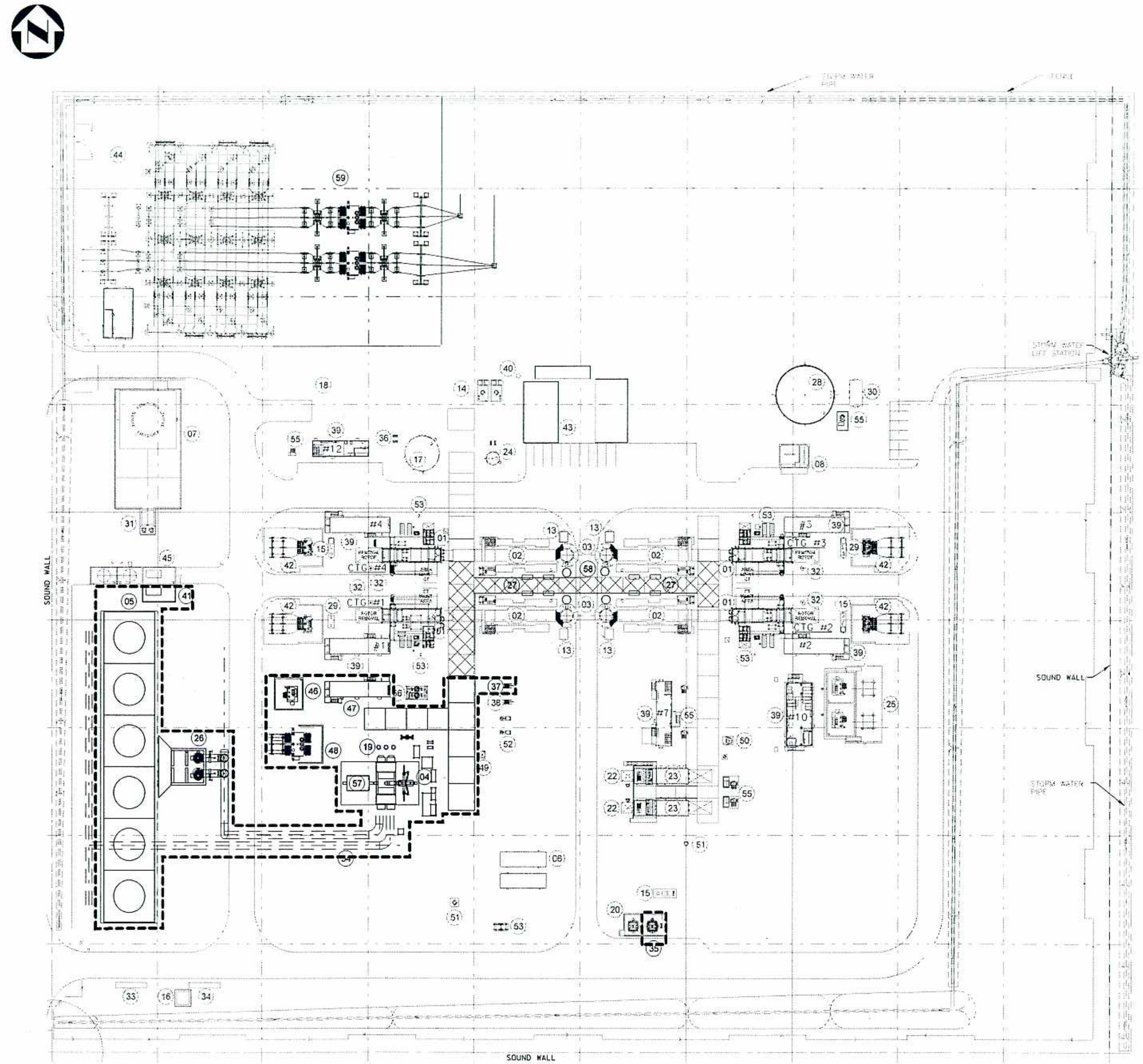
Project Name: Los Esteros Critical Energy Facility

SAMPLING STATION(#)	CONTROL STATION(C-1)	S-1	S-2	S-3	S-4
DATE					
PH, units					
Conductivity, umhos/cm					
Turbidity, ntu					
Dissolved Oxygen, mg/l					
Oil and Grease, mg/l					
Total Suspended Solids, mg/l					
Total Organic Carbon, mg/l					
Total Petroleum Hydrocarbons, mg/l					

COMMENTS:

Attachment 1

General Site Arrangement



LEGEND

1. COMBUSTION TURBINE (CT)
2. HRSG CASING WITH SCR/CO SYSTEMS
3. HRSG STACK
4. STEAM TURBINE
5. COOLING TOWER (6 CELL) (NEW)
6. FUEL GAS COMPRESSORS
7. COOLING TOWER (1 CELL)
8.
9. AUXILIARY SKIDS
10. SPRINT SKIDS
11. GENERATOR CIRCUIT BREAKER
12. WATER INJECTION SKIDS
13. CEMS ENCLOSURES
14. AIR COMPRESSOR/AIR DRYER SKIDS/AIR RECEIVER
15. OIL WATER SEPARATORS
16. PROCESS SUMP & PUMPS
17. DEMINERALIZED WATER STORAGE TANK
18. WATER TREATMENT AREA
19. CONDENSER
20. AQUEOUS AMMONIA STORAGE TANK & PUMPS
21. AMMONIA FEED SKIDS
22. CTG INLET AIR CHILLER SYSTEM
23. CTG CHILLED WATER PUMPS
24. POTABLE WATER TANK AND PUMPS
25. PRIMARY AUXILIARY TRANSFORMERS
26. CIRCULATING WATER PUMPS (NEW)
27. BOILER FEED WATER PUMPS (NEW)
28. RAW WATER STORAGE TANK
29. WATER WASH DRAIN TANKS
30. FIREWATER PUMPS
31. AUXILIARY COOLING WATER PUMPS
32. COIL CONDENSATE SUMP W/PUMP
33. PLANT WATER METER
34. PG&E FUEL GAS METER
35. AQUEOUS AMMONIA STORAGE TANK (NEW)
36. DEMINERALIZED WATER TRANSFER PUMPS
37. EQUIPMENT COOLING WATE HEAT EXCHANGER (NEW)
38. EQUIPMENT COOLING WATER HEAT EXCHANGER
39. POWER DISTRIBUTION CENTERS (PDC)
40. SANITARY WASTE LIFT STATION
41. CIRCULATING WATER CHEMICAL FEED SYSTEM (NEW)
42. GENERATOR STEP-UP TRANSFORMER
43. CONTROL, OFFICE AND SERVICE AREA
44. 115 kV SWITCHYARD
45. CIRCULATING WATER CHEMICAL FEED SYSTEM
46. STG UNIT AUXILIARY TRANSFORMER (NEW)
47. STG POWER DISTRIBUTION CENTER (NEW)
48. STG GENERATOR STEP-UP TRANSFORMER (NEW)
49. EQUIP COOLING WATER EXPANS. TK & AIR SEPAR
50. CHILLED WATER EXPANSION TK & AIR SEPARATOR
51. INSTRUMENT AIR RECEIVER
52. EQUIPMENT COOLING PUMPS
53. FUEL GAS FILTER/SEPARATORS
54. U/G CIRCULATING WATER PIPING (NEW)
55. SECONDARY AUXILIARY TRANSFORMERS
56. CHILLER CIRCULATING WATER STRAINER
57. ST GENERATOR (NEW)
58. BLOWDOWN TANK (TYP. 4) (NEW)
59. 115/230 KV SVP SWITCHYARD

PHASE 2 ITEMS

ADD NEW LEVEL OF PIPE RACK TO EXISTING PIPE RACK (PHASE 2)

80 0 80 160 240

SCALE IN FEET

REV	DATE	DESCRIPTION	DRAWN	CHECKED	ENGINEER	PROJ ENGR MANAGER	PROJECT MANAGER
-	-						
-	-						
-	-						
-	-						
B	12-11-03	ADD SVP SWITCHYARD/BBS TANKS					
A	10-31-03	ISSUED FOR PERMITTING					

DRAWN BY: K BLAIR	DATE: 10-31-03
CHECKED BY: G BAXTER	DATE: 10-31-03
ENGINEER: G BAXTER	DATE: 10-31-03
PROJECT ENGINEERING MANAGER: -	DATE: -
PROJECT MANAGER: -	DATE: -

CALPINE

PROJECT NO.

LOS ESTEROS CRITICAL ENERGY FACILITY
GENERAL ARRANGEMENT
COMBINED CYCLE CONVERSION (PHASE 2)

SCALE: 1" = 50'-0"

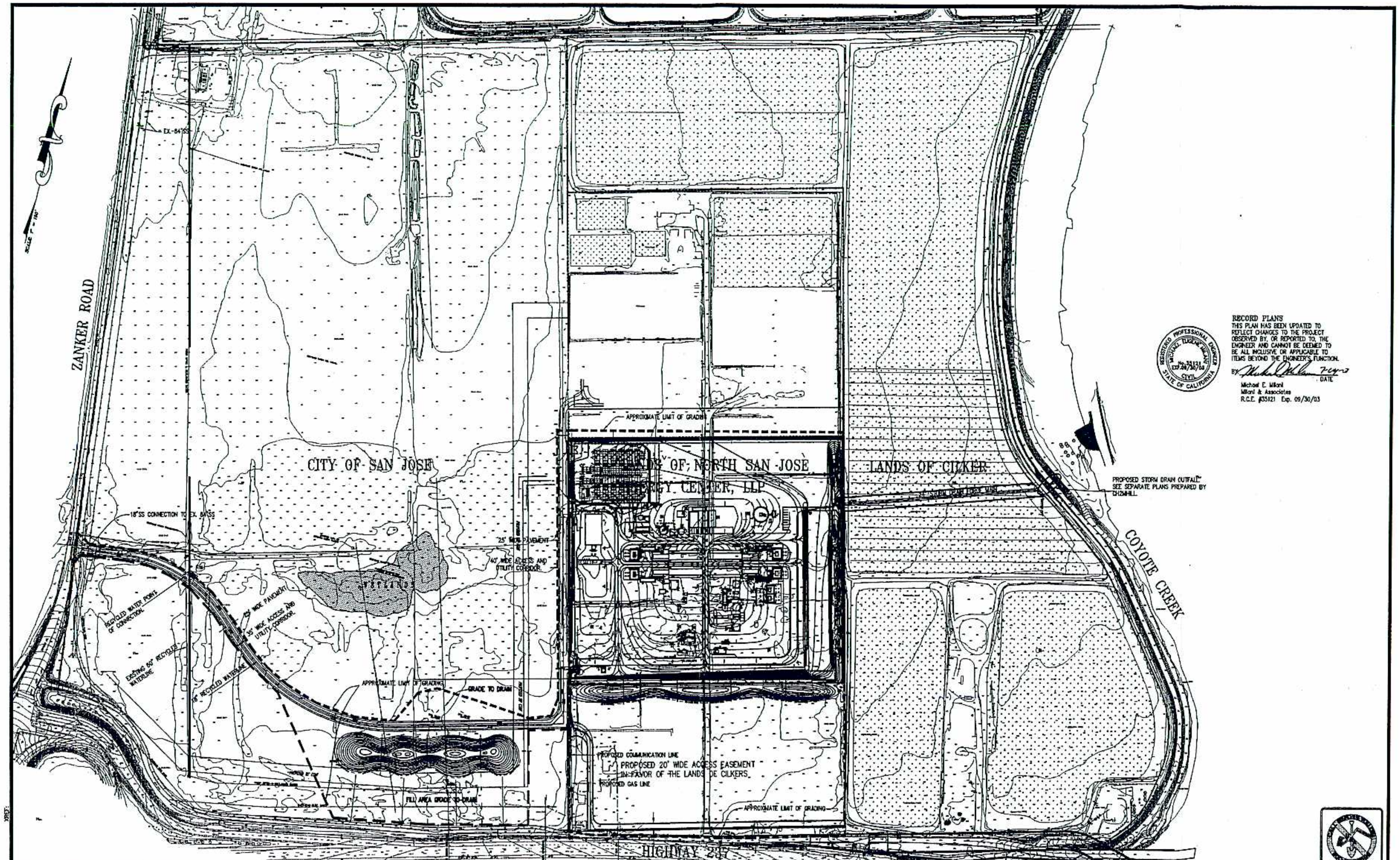
DWG. NO. LECEF2-G-1001 REVISION B

23-DEC-2003

24x36

Attachment 2

Grading Plan



	NO.	BY	DATE	REVISIONS	BY	DATE
1" = 150'	5	RKH	3.17.03	MOVED BERM / ADDED 55' SY EASEMENT		
	4	RKH	2.11.03	REVISED WALL AND EARTH BERM		
	3	RKH	2.11.03	REVISED FINISH GRADES		
	2	RKH	9.5.02	MOVED N/S DITCH & SD TO THE EAST/ADDED WALL & BERM		
	1	RKH	6.27.02	FINAL SUBMITTAL		

APPROVAL

PREPARED BY, OR UNDER THE DIRECTION OF:
BY: M.E.M.
R.C.E. No. 35121
DATE:

Planning
Surveying & Mapping
Land Development Engineering
Municipal Engineering
Construction Staking
Construction Management

MILANI & Associates

4071 Port Chicago Highway
Suite 100
Concord, CA 94520
Phone: (925) 674-9082
Fax: (925)674-9279

LOS ESTEROS CRITICAL ENERGY FACILITY–PHASE I

CALPINE C* POWER

GRADING PLAN

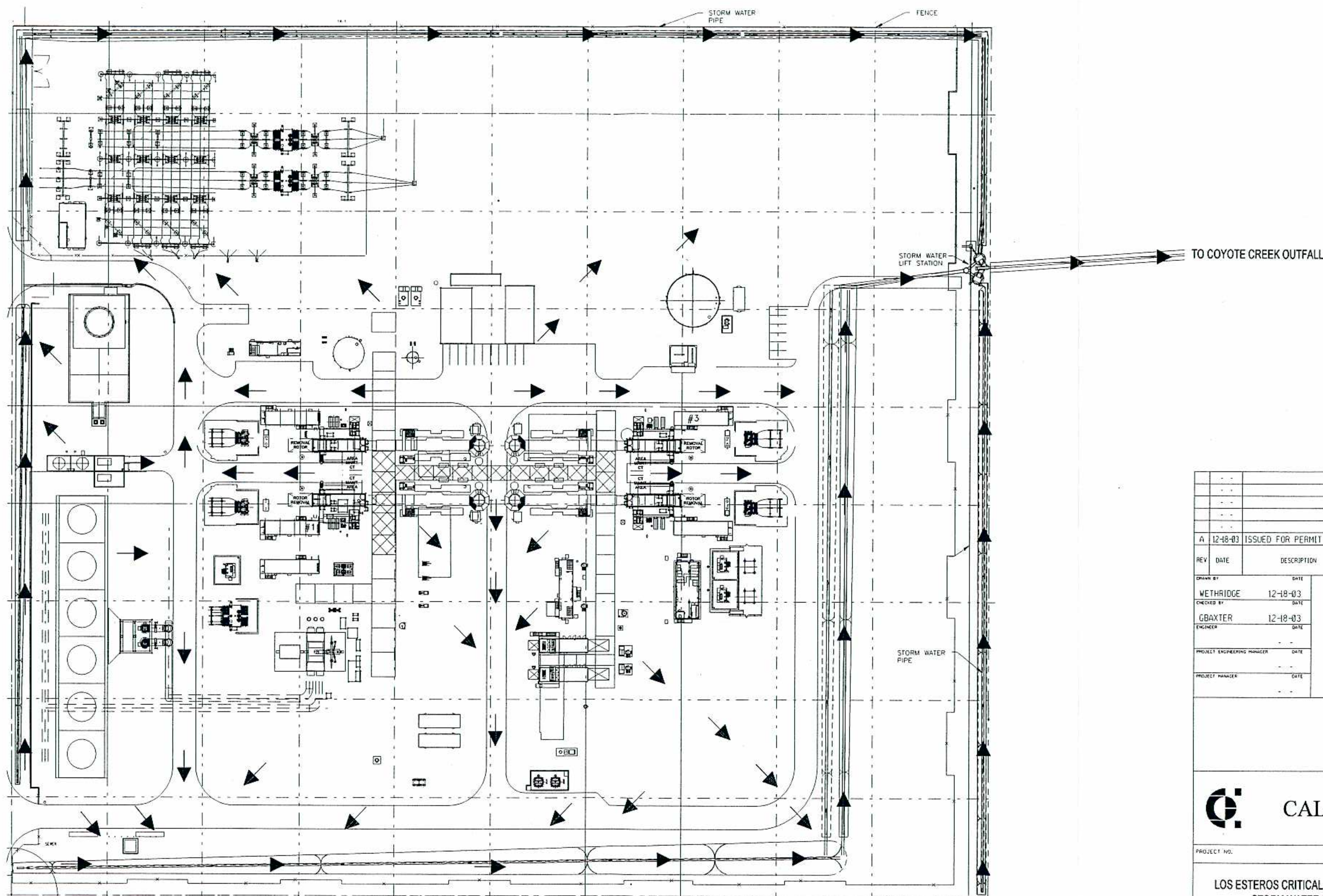
OVERALL SITE PLAN

CITY OF SAN JOSE — SANTA CLARA COUNTY — CALIFORNIA

DWG: GRADING/OP3.DWG
SHEET 5 OF 7 SHEETS
JOB NO. 210043-10

Attachment 3

Storm Water Drainage Plan (Phase 2)



REV	DATE	DESCRIPTION	DRAWN	CHECKED	PROJ ENGR MANAGER	PROJECT MANAGER
A	12-18-03	ISSUED FOR PERMIT	WE	GB	GB	

DRAWN BY: WETHRIDGE — DATE: 12-18-03
CHECKED BY: GBAXTER — DATE: 12-18-03
ENGINEER — DATE: -
PROJECT ENGINEERING MANAGER — DATE: -
PROJECT MANAGER — DATE: -

CALPINE

PROJECT NO.

LOS ESTEROS CRITICAL ENERGY FACILITY
STORM WATER DRAINAGE
COMBINED CYCLE CONVERSION (PHASE 2)

SCALE

DWG. NO. LECEF2-G-1005 — REVISION A

BASE 2D GRADING.DGN

24x36

Attachment 4

List of Contractors

There are currently no amendments to the SWPPP

Attachment 5

List of Authorized SWPPP Inspection Individuals

There are currently no amendments to the SWPPP

Attachment 6

List of Amendments to the SWPPP

There are currently no amendments to the SWPPP

Technical Area: Traffic and Transportation (43-45)

Hazardous Materials Delivery Route

43. Please provide a proposed hazardous material delivery route and describe the land uses within 500 feet on both sides of the street/road.

Response: The response to this data request is provided under separate cover with a request for confidentiality, per CEC Siting Office policy.

Collision data

44. Please provide collision analysis data for the intersections listed in Section 8.10.2.3.

Response: Table DR44-1 provides the collision data for the intersections requested (per discussion with Amanda Stennick of CEC Staff) for the three-year period ending March 31, 2004.

Table DR44-1
Collision Data for Project-Area Intersections

Intersection	Number of collisions (4/1/03 to 3/31/04)
Zanker Road and SR 237 (north)	5
Zanker Road and SR 237 (south)	2
Zanker Road and Tasman Drive	13
Zanker Road and Montague Expressway	4

Source: Ron Coquia, City of San Jose Department of Transportation, personal communication, April 26, 2004

Traffic Tables

45. a. *Please provide a current table similar to Table 8.10-1 in the 2001 LECEF AFC which shows intersection, peak hour, count date, average delay (seconds per vehicle), and LOS.*

   b. *Please provide a current table similar Table 8.10-2 in the 2001 LECEF AFC which shows for both mixed flow lanes and High Occupancy Vehicle (HOV) lanes the freeway segment, direction, peak hour, average speed, number of lanes, volume, density, and Level of Service (LOS).*

   c. *Please indicate which study intersections fall under which jurisdictions (e.g. City of San Jose, Milpitas, Santa Clara County, Caltrans).*

Response: Updated tables 8.10-1 and 8.10-2 from the Phase 1 AFC are included as Attachment TT-1.

ATTACHMENT TT-1

Revised Traffic Tables 8.10-1 and 8.10-2

From the Phase 1 AFC

TABLE 8.10-1
Existing Intersection Levels of Service

Intersection	Peak Hour	Count Date	Ave. Delay (sec. Per vehicle)	LOS
City of San Jose Intersections				
Zanker Rd./SR 237 (N)*	AM	3/28/00	7	B
	PM	2002		B
Zanker Rd./SR 237 (S)*	AM	3/28/00		B
	PM	2002		B
Zanker Rd./Holger Wy	AM	3/14/00	9	B
	PM	3/15/00	10	B
Zanker Rd./Tasman Dr.	AM	3/14/00	27	D
	PM	3/15/00	27	D
Zanker Rd./River Oaks Pkwy.	AM	3/16/00	16	C
	PM	3/15/00	14	B
Zanker Rd./Innovation Dr.	AM	3/08/00	16	C
	PM	3/02/00	20	C
Zanker Rd./Plumeria Dr.	AM	3/21/00	18	C
	PM	3/21/00	18	C
Zanker Rd./Trimble Rd.*	AM	3/12/00	27	D
	PM	2002		NM
Zanker Rd./Bonaventura Dr.	AM	3/30/00	6	B
	PM	3/30/00	8	B
Zanker Rd./Charcot Av.	AM	3/14/00	20	C
	PM	3/14/00	27	D
Zanker Rd./Brokaw Rd.*	AM	3/17/00	35	D
	PM	2002		NM
Bering Dr./Brokaw Rd.	AM	3/14/00	14	B
	PM	3/14/00	17	C
US 101/Brokaw Rd.*	AM	5/19/00	22	C
	PM	2002		C
Cisco Wy/Tasman Dr.	AM	3/16/00	12	B
	PM	3/15/00	15	B
Morbridge Dr./Tasman Dr.	AM	3/30/00	12	B
	PM	3/30/00	12	B
Baypointe Pkwy./Tasman Dr.	AM	3/29/00	15	B
	PM	3/29/00	8	B
North First St./Tasman Dr.	AM	3/16/00	26	D
	PM	3/16/00	29	D
North First St./Rio Robles	AM	3/21/00	12	B
	PM	3/21/00	17	C
North First St./River Oaks Pkwy.	AM	3/21/00	18	C

TABLE 8.10-1
Existing Intersection Levels of Service

Intersection	Peak Hour	Count Date	Ave. Delay (sec. Per vehicle)	LOS
	PM	3/21/00	23	C
North First St./Trimble Rd.*	AM	3/21/00	34	D
	PM	2002		D
North First St./Charcot Av.	AM	3/15/00	26	D
	PM	3/15/00	29	D
North First St./Brokaw Rd.*	AM	2/24/00	35	D
	PM	2002		D
De La Cruz Blvd./Trimble Rd.*	AM	5/16/00	25	C
	PM	2002		D
Orchard Pkwy./Trimble Rd.	AM	3/14/00	14	B
	PM	3/14/00	18	C
North First St./Montague Expwy.*	AM	5/17/00	48	E
	PM	2002		F
Zanker Rd./Montague Expwy.	AM	2002	3453	D
	PM	2002		D
O'Toole Av-McCarthy Blvd./Montague Expwy.*	AM	5/17/00	89	F
	PM	2002		F
City of Santa Clara Intersections				
De La Cruz Blvd./Montague Expwy.*	AM	10/7/98	41	E
	PM	2002		D
Mission College Blvd./Montague Expwy.*	AM	4/15/98	75	F
	PM	2002		D
City of Milpitas Intersections				
Abbott Av./Calaveras Blvd.	AM	3/23/00	57	E
	PM	3/23/00	25	C
Serra Wy./Calaveras Blvd.	AM	3/21/00	11	B
	PM	3/15/00	18	C
Abel St./Calaveras Blvd.*	AM	10/8/98	33	D
	PM	2002		D
South Milpitas Blvd./Calaveras Blvd.*	AM	10/6/98	34	D
	PM	2002		D
Hillview Dr./Calaveras Blvd.	AM	5/4/00	25	C
	PM	5/9/00	26	D
McCarthy Blvd./Tasman Dr.	AM	6/15/99	19	C
	PM	6/15/99	29	D
Alder Dr./Tasman Dr.	AM	6/16/99	11	B
	PM	6/16/99	40	D
SB I-880 off ramp/Tasman Dr.	AM	6/17/99	20	C
	PM	6/17/99	21	C

TABLE 8.10-1
Existing Intersection Levels of Service

Intersection	Peak Hour	Count Date	Ave. Delay (sec. Per vehicle)	LOS
NB I-880 off ramp/Great Mall Pkwy.	AM	6/17/99	25	C
	PM	6/17/99	43	E
Abel St./Great Mall Pkwy.	AM	1/26/00	29	D
	PM	10/12/99	21	C
McCarthy Blvd./SR 237 (S)	AM	5/17/00	17	C
	PM	5/17/00	11	B

NM – Not Measured in Santa Clara Valley Transportation Authority, 2002 Monitoring & Conformance Report.
Highlight: Results from Santa Clara Valley Transportation Authority, 2002 Monitoring & Conformance Report, Table 3.2.
*Denotes CMP intersection.
Hightlight: new information since 2001.

Source: US Dataport PDZ DEIR, Table 6

TABLE 8.10-2
Freeway Segments Levels of Service – Existing Condition[1]

				Mixed Flow Lanes					HOV Lanes				
Freeway	Segment	Direction	Peak Hour	Speed	# of Lanes	Flow	Density[2]	LOS[3]	Speed	# of Lanes	Flow	Density[2]	LOS[3]
SR 237	Mathilda to Lawrence	EB	AM	48	2	4,320	61	F	67	1	1,850	28	A
			PM	66	2	3,170	24	A	67	1	540	8	A
SR 237	Lawrence to Great America	EB	AM	39	2	4,130	53	E	63	1	2,140	34	A
			PM	65	2	3,080	23	A	67	1	800	12	A
SR 237	Great America to North First	EB	AM	48	2	4,320	45	D	54	1	2,210	41	C
			PM	38	2	4,100	54	E	67	1	740	11	A
SR 237	North First to Zanker	EB	AM	42	2	4,200	50	E	65	1	1,950	30	A
			PM	13	2	2,700	104	F	67	1	1,340	20	A
SR 237	Zanker to I-880	EB	AM	66	2	3,300	25	A	67	1	1,070	16	A
			PM	6	2	1,660	138	F	11	1	1,230	112	F
I-880	South of Montague	NB	AM	62	2	4340	35	A	N/A	N/A	0	N/A	N/A
			PM	25	2	3600	72	F	N/A	N/A	0	N/A	N/A
I-880	Montague to Tasman	NB	AM	67	3	4,020	20	A	N/A	N/A	0	N/A	N/A
			PM	11	3	3,630	110	F	N/A	N/A	0	N/A	N/A
I-880	Tasman to SR 237	NB	AM	67	3	4,020	20	A	N/A	N/A	0	N/A	N/A
			PM	12	3	3,920	109	F	N/A	N/A	0	N/A	N/A
I-880	SR 237 to Dixon Landing	NB	AM	66	4	5,940	25	A	N/A	N/A	0	N/A	N/A
			PM	54	4	7,970	41	C	N/A	N/A	0	N/A	N/A
US 101	South of Trimble	NB	AM	34	3	6,020	59	F	33	1	1,980	60	F
			PM	52	3	6,550	42	D	67	1	1,010	15	A
US 101	South of Trimble	SB	AM	66	3	5,540	28	A	67	1	670	10	A
			PM	22	3	5,150	78	F	59	1	2,180	37	B
I-880	Dixon Landing to SR 237	SB	AM	66	4	5,700	24	A	N/A	N/A	0	N/A	N/A
			PM	67	4	4,100	17	A	N/A	N/A	0	N/A	N/A
I-880	SR 237 to Tasman	SB	AM	66	3	4,750	24	A	N/A	N/A	0	N/A	N/A
			PM	67	3	3,620	17	A	N/A	N/A	0	N/A	N/A

TABLE 8.10-2
Freeway Segments Levels of Service – Existing Condition[1]

				Mixed Flow Lanes					HOV Lanes				
Freeway	Segment	Direction	Peak Hour	Speed	# of Lanes	Flow	Density[2]	LOS[3]	Speed	# of Lanes	Flow	Density[2]	LOS[3]
I-880	Tasman to Montague	SB	AM	67	3	4,620	23	A	N/A	N/A	0	N/A	N/A
			PM	50	3	6,600	44	D	N/A	N/A	0	N/A	N/A
I-880	South of Montague	SB	AM	64	2	4,100	32	A	N/A	N/A	0	N/A	N/A
			PM	13	2	2,680	103	F	N/A	N/A	0	N/A	N/A
SR 237	I-880 to Zanker	WB	AM	15	3	3,680	98	F	54	1	2,210	41	C
			PM	30	3	4,800	64	F	67	1	740	11	A
SR 237	Zanker to North First	WB	AM	42	2	4,200	50	E	48	1	2,160	45	D
			PM	38	2	4,100	54	E	67	1	940	14	A
SR 237	North First to Great America	WB	AM	63	2	4,280	34	A	61	1	2,200	36	A
			PM	47	2	4,320	46	D	67	1	1,010	15	A
SR 237	Great America to Lawrence	WB	AM	66	2	3,300	25	A	67	1	1,210	18	A
			PM	64	2	4,100	32	A	67	1	740	11	A
SR 237	Lawrence to Mathilda	WB	AM	66	2	3,560	27	A	67	1	800	12	A
			PM	64	2	4,100	32	A	67	1	940	14	A

[1] Source: Santa Clara Valley Transportation Authority, 2002 Monitoring and Conformance Report, Tables 5.6 and 5.7.
[2] Density is passenger cars per lane per mile. Peak density determined from aerial photographs and using calibrated Van Aerde Speed-Density Curve.
[3] LOS not defined by HCM based density, but the Van Aerde Speed-Density Curve as follows.

LOS A: < 35 pcplpm

LOS B: 35.1 to 38 pcplpm

LOS C: 38.1 to 41 pcplpm

LOS D: 41.1 to 47 pcplpm

LOS E: 47.1 to 57 pcplpm

LOS F: > 57 pcplpm

Technical Area: Transmission System Engineering (46)

System Impact Study

46. *Provide a System Impact Study completed by the interconnecting utility or PG&E for any interconnection for which you are seeking certification. The study or studies should at a minimum demonstrate conformance or non-conformance with NERC/WSCC, California Independent System Operator (Cal-ISO) and utility reliability and planning criteria with the following provisions:*

    a. *Identify major assumptions in the base cases including imports and exports to the system, major generation including hydro, load changes in the system and queue generation.*
    b. *Analyze system for Power Flow for N-0, important N-1 and critical N-2 contingency conditions, and provide a list of pre and post project overload criteria violations.*
    c. *Analyze system for Transient Stability and Post-transient voltage conditions under critical N-1 and N-2 contingencies, and provide related plots, switching data and a list of voltage criteria violations.*
    d. *Provide a Short Circuit Study Report showing fault currents at important substation buses with and without the new generation and respective breaker interrupting ratings in a table side by side.*
    e. *Identify the reliability and planning criteria utilized to determine the criteria violations.*
    f. *Provide a list of contingencies evaluated for each study.*
    g. *List mitigation measures considered and those selected for all criteria violations.*
    h. *Provide power flow diagrams (MW, % loading & P. U. voltage) for base cases with and without the project. Power flow diagrams must also be provided for all N-0, N-1 and N-2 studies where overloads or voltage violations occur.*
    i. *Provide electronic copies of *.sav and *.drw GE PSLF and EPCL contingency and comparison files (if available).*

Response: See the attached draft System Impact Study & Facilities Study - Study Report (Attachment TSE-1). PG&E is currently completing the remaining portions of the SIS and Applicant will work with SVP and PG&E to provide the final and complete report to Staff as soon as possible.

ATTACHMENT TSE-1

Draft System Impact Study & Facilities Study

Study Report

System Impact Study
& Facilities Study

Study Report

Silicon Valley Power / Calpine

230 kV Switching Station and LECEF Interconnection into PG&E's Los Esteros Substation

Draft

Pacific Gas and Electric Company

April 27, 2004

Table of Contents

Executive Summary

Silicon Valley Power ("SVP"), the municipal utility for the City of Santa Clara, is presently engineering a new 230 kV line between its Northern Receiving Station ("NRS") and PG&E's Los Esteros Substation. The new 230 kV line will not terminate directly into Los Esteros Substation. SVP is planning on constructing a 230 kV Switching Station between Los Esteros and Calpine's Los Esteros Critical Energy Facility ("LECEF"). This project is to be completed in December 2004.

The design of the SVP Switching Station will mimic the breaker-and-a-half layout of the Los Esteros 230 kV buses. The 230 kV buses of the Switching Station will be connected to the Los Esteros 230 kV buses, with disconnect switches between the two stations. Metering will be installed on each 230 kV bus to monitor the power flows between the two stations.

Calpine's LECEF Project presently consists of four simple-cycle combustion turbine-generators. The LECEF 115 kV switchyard is connected into the PG&E transmission system by a simple tap connection into the Los Esteros-Nortech 115 kV line. The California Energy Commission ("CEC") approved this Phase 1 plant configuration for the LECEF Project back in 2002.

Calpine recently filed an Application for Certification ("AFC") with the CEC for Phase 2 of the LECEF Project. Phase 2 would convert LECEF into combined-cycle operation by adding heat recovery steam generators ("HRSG's") and a 140 MW steam turbine-generator. As part of the Phase 2 work, the 115 kV tap line connection for LECEF would be removed and a new 230 kV connection into the SVP Switching Station would be constructed. The LECEF 115 kV switchyard would connect to the SVP Switching Station via two 230/115 kV transformers. The operational date of LECEF Phase 2 is to be 2008.

SVP requested that PG&E study the connection of the LECEF Phase 2 generation into its 230 kV Switching Station to determine any potential system impacts and to develop the costs to interconnect the SVP/Calpine station to Los Esteros. The analytical portion of this Study has looked at how the proposed interconnection impacts transmission system equipment loadings, system fault duty levels and overall system stability.

Power flow results for 2008 Summer peak and off-peak conditions found no adverse impacts to the transmission system with the additional generation for LECEF Phase 2 and the connection into the SVP Switching Station. For all of the Category B and C contingencies studied, the conversion of LECEF into combined-cycle operation results in no change or a slight reduction in critical equipment loadings throughout the South Bay area.

Fault duty analysis has not yet been completed and is not included in this draft report.

Dynamic stability analysis is being completed and is also not included in this draft. To date, no instabilities were found.

With the interconnection of LECEF Phase 2 into the SVP Switching Station, circuit breakers will be required between the Los Esteros and Switching Station 230 kV buses. Cost estimates for the station equipment and protection modifications necessary for this interconnection are still be developed at this time.

Introduction and Proposed Interconnection

Silicon Valley Power ("SVP") is constructing a 230 kV line between their Northern Receiving Station ("NRS") and PG&E's Los Esteros Substation. SVP is responsible for the permitting and construction of the 230kV line and the associated 230 kV SVP Switching Station to be constructed between PG&E's Los Esteros Substation and Calpine's Los Esteros Critical Energy Facility ("LECEF") generation project.

The Switching Station is to be connected into Los Esteros by simply extending the Los Esteros 230 kV buses and constructing a new breaker-and-a-half bay in the Switching Station. (Appendix 3 is a schematic of the SVP 230 kV project.) SVP is responsible for all of the construction work in the Switching Station; PG&E is only responsible for the connection "integration" of the SVP Switching Station 230 kV buses into Los Esteros Substation 230 kV buses. Figure 1 is a schematic of the interconnection arrangement for the Switching Station.

Calpine's LECEF generation project presently consists of four, simple-cycle combustion turbines (CT's), with a total plant output of slightly below 200 MW. The plant is connected into PG&E's transmission system via a tap connection into PG&E's Los Esteros-Nortech 115 kV line.

As part of the original approval for LECEF by the California Energy Commission ("CEC"), Calpine was also required to re-file with the CEC for expanding LECEF into a combined-cycle facility within three years. PG&E has studied a LECEF combined-cycle generation proposal for Calpine. That study proposed to connect a 240 MW combined-cycle plant directly into PG&E's Los Esteros 115 kV buses via two underground lines.

Recently, SVP and Calpine proposed an alternative arrangement for interconnecting the SVP Switching Station and LECEF into Los Esteros Substation. Appendix 4 shows their proposal. This arrangement would connect LECEF into SVP's 230 kV Switching Station through two 230/115 kV transformers, with the Switching Station buses being extended to accommodate the new connections. (Thus, there would be no direct 115 kV connection between LECEF and PG&E's system.) Calpine's future expansion of LECEF into two combined-cycle units would utilize this new arrangement.

SVP and Calpine have requested that PG&E conduct a System Impact/ Facilities Study (SI/FS) for the proposed arrangement. The Study will evaluate:

1. the proposed arrangement for potential impacts to the overall reliability and operability of PG&E's Los Esteros Substation; and
2. the overall San Jose transmission system for potential system impacts caused by the new arrangement.

Mitigation measures, if any, will be identified and costs for them will be developed as part of this Study. This Study Plan will form the basis for the Study Agreement by defining the scope, content, assumptions, and terms of reference for the Study.

According to SVP and Calpine, the proposed connection of the SVP Switching Station to Los Esteros is expected to occur in late 2004/early 2005. And the expansion of LECEF to combined-cycle operation and connection to the SVP Switching Station is expected in 2008.

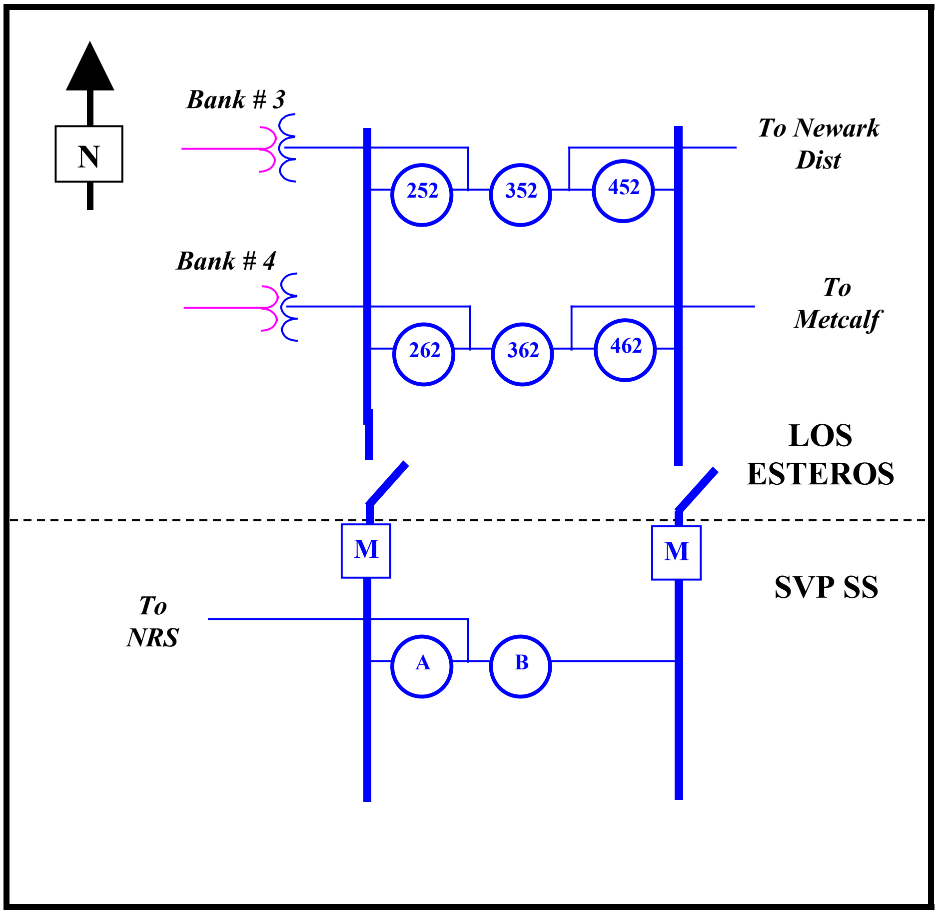


Figure 1: Proposed Connection of SVP Switching Station to Los Esteros Substation

Existing North San Jose Transmission System

The North San Jose transmission system serves SVP and a portion of the City of San Jose (north of downtown San Jose, including a portion of downtown San Jose). PG&E distribution substations in this area are Trimble, Montague, Nortech, River Oaks, FMC and part of San Jose Station B. The transmission system also serves the San Jose-Santa Clara Water Pollution Control Plant ("WPCP"). Figure 2 shows how the North San Jose transmission system integrates into the overall San Jose transmission system.

Peak load in the North San Jose area last summer was about 800 MW, with SVP accounting for slightly over half of the total. By 2008, the area is expected to have a peak load of over 900 MW.

With the addition of SVP's 120 MW Donald Von Raesfeld ("Pico") Power Plant in late 2004, the North San Jose area will have approximately 420 MW of "internal" generation. Other generators in the area are: SVP's Gianera CT's, the Santa Clara cogen units, the old Container Corp. of America unit, Calpine's LECEF and Agnews facilities and the generation at WPCP.

The conversion of LECEF into a combined-cycle facility, with the addition of a 140 MW steam turbine-generator, will increase the internal generation in the North San Jose area to approximately 560 MW – or less than 65% of peak power demand in the area. This means that the area will still need to import over 300 MW of power in 2008.

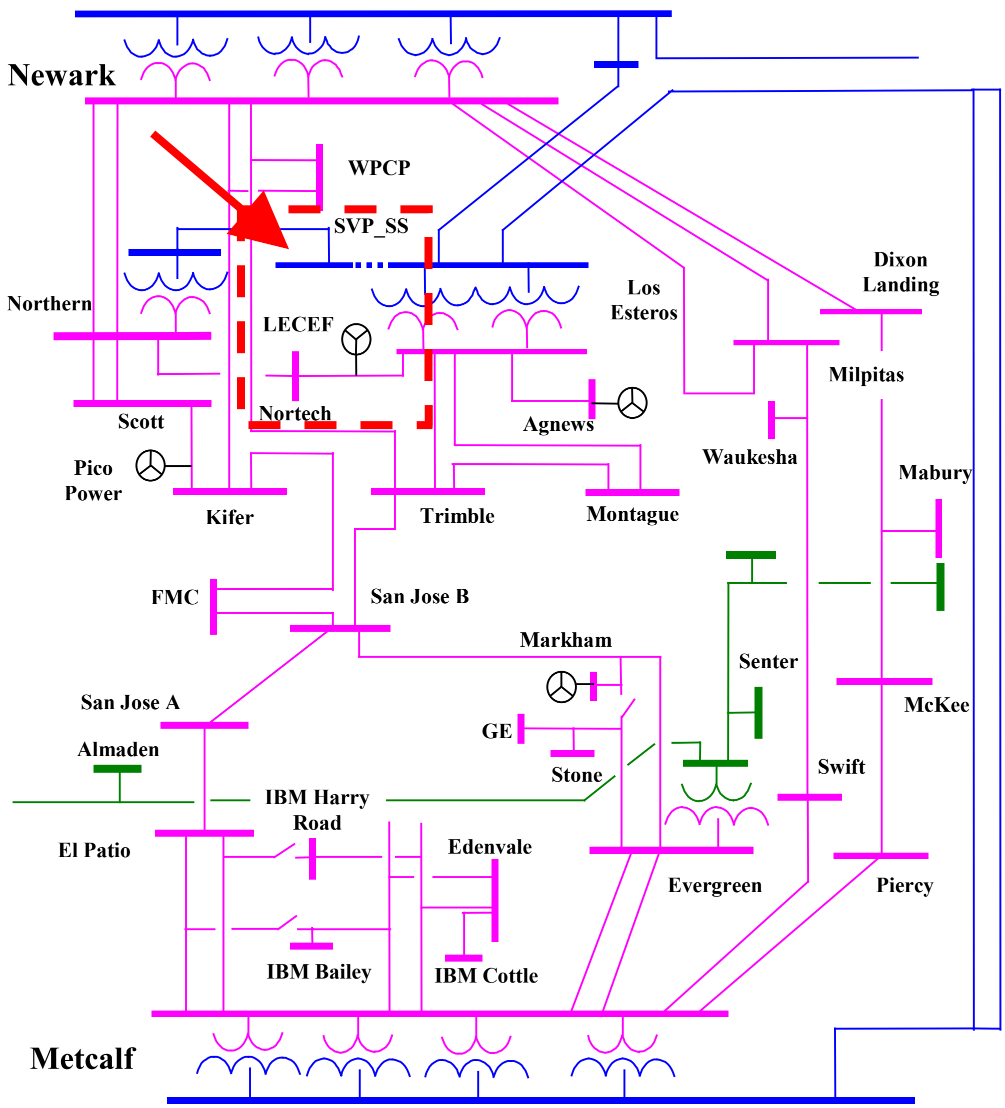


Figure 2: "Existing" Connection of SVP Switching Station and LECEF at Los Esteros Substation

There are also new transmission lines being constructed in the North San Jose area. PG&E has recently completed the construction of a 115 kV line between its Nortech Substation and NRS. The line will provide a third "outlet" line into the North San Jose area for power from Los Esteros and LECEF.

In addition to the Pico plant, SVP is also constructing a 230 kV line between NRS and a new 230 kV Switching Station, which will be located between Los Esteros and the LECEF plant

(Figure 3). Both SVP projects are to be completed in late 2004 or early 2005. The 230 kV line consists of an underground section and an overhead section. (See Appendix 3.) Technical details of the two line sections are:

Underground Section: 2-2000 kcmil copper conductor; 2.3 miles in length
Ratings = 2,082 Amps (normal); 2,344 Amps (emergency)
Positive-sequence impedance = 0.01851 + j 0.1746 ohm/mile
Zero-sequence impedance = 0.1617 + j 1.6366 ohms/mile
Overhead Section: 2-1113 kcmil AAC conductor; 2.4 miles in length
Ratings = 2,206 Amps (normal); 2,864 Amps (emergency)
Positive-sequence impedance = 0.04756 + j 0.4867 ohm/mile
Zero-sequence impedance = 0.3239 + j 2.315 ohms/mile
Configuration at NRS: One 230/115 kV transformer
Ratings = 400 MVA (normal); *420 MVA (emergency)*
Positive-sequence impedance = ~5% on 240 MVA base
Zero-sequence impedance = ~4.25% on 240 MVA base

The addition of the new transmission lines will increase the flows on the NRS-Scott 115 kV lines to the point where the lines could experience an overload for an outage of one line and the Pico generation. PG&E is planning to reconductor these two lines before Summer 2005.

Figure 3: Site of Proposed SVP 230 kV Switching Station

(Los Esteros Substation is on the left; LECEF Switchyard is on the right)

Project Information and Interconnection Plan

Appendix 4 provides information on the physical layout of the proposed expansion of LECEF into a combined-cycle plant. The heat recovery steam generators ("HRSG's") for the existing four combustion turbine-generators ("CTG's") will provide steam to power a new 140 MW steam turbine-generator ("STG") – the plant will be a 4x1 configuration.

The new STG will be connected to the LECEF 115 kV switchyard by a 13.8/115 kV step-up transformer. The step-up bank will have a high-side tap setting of 117.875 kV, similar to the CTG step-up banks.

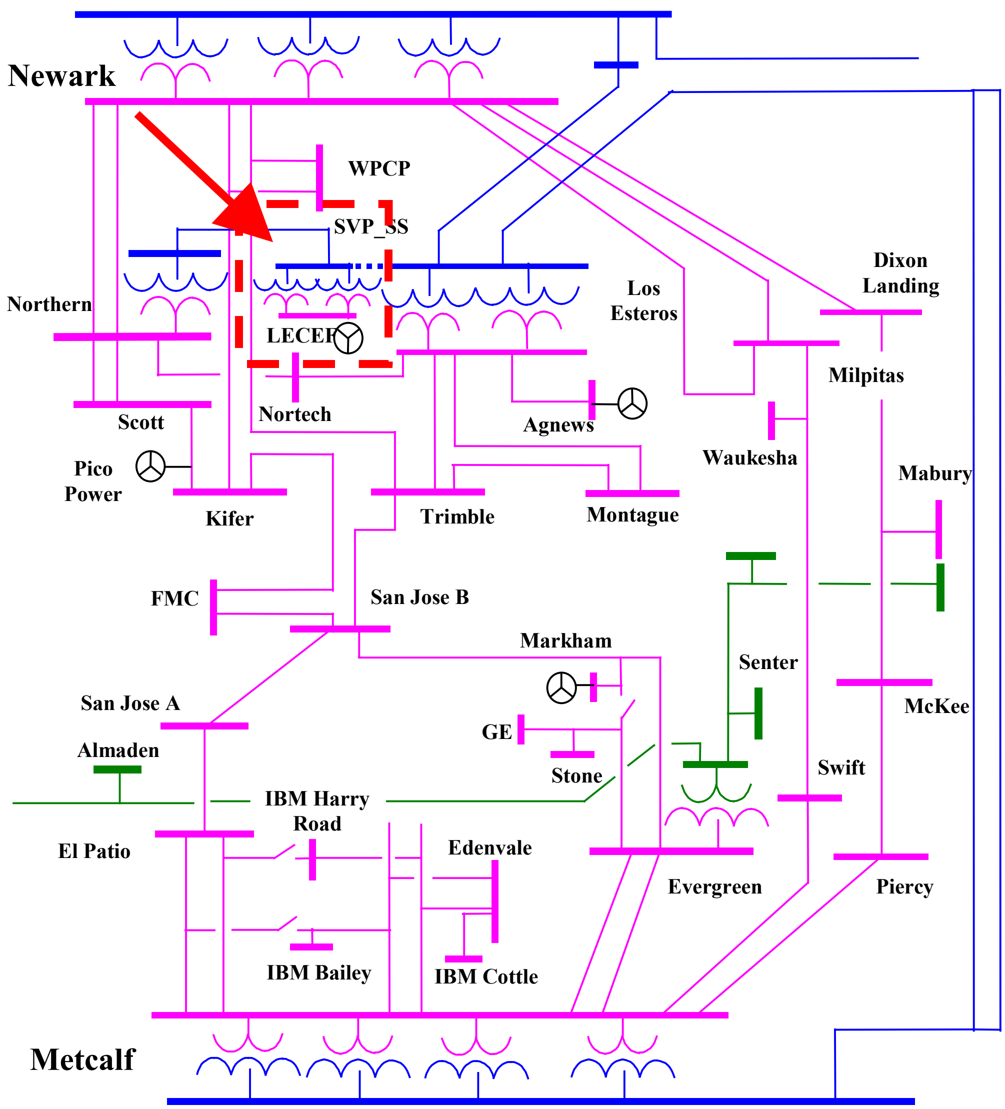


Figure 4: Proposed Connection of SVP Switching Station and LECEF to Los Esteros Substation

Two 230/115 kV autotransformers will be used to connect the LECEF 115 kV switchyard with the SVP Switching Station. The banks will be rated

210 MVA (OA) / 280 MVA (FA) / 350 MVA (OFA).

Per information received from Calpine, the transformer voltage ratios and impedances will be similar to PG&E's Los Esteros Banks # 3 and 4.

Figure 4 shows the layout of the San Jose transmission system with the connection of the LECEF plant to the SVP Switching Station.

Study Assumptions

PG&E conducted the study under the following assumptions:

1) The interconnection of SVP's Switching Station into PG&E's Los Esteros Substation will be late 2004 or early 2005. The interconnection of Calpine's LECEF plant into the SVP Switching Station will be in 2008.
2) SVP will own the entire 230 kV circuit from Northern Receiving Station to their new Switching Station, including the 230 kV breaker(s) for the line, any associated switches and additional 230 kV bus structures. Additional equipment and structures to interconnect the LECEF project will be the responsibility of either SVP or Calpine.
3) SVP will engineer, procure materials for, construct, own, and maintain the proposed 230 kV transmission line and Switching Station. SVP will also be responsible for all permitting and environmental work associated with their proposed 230 kV line and Switching Station. SVP and/or Calpine will be responsible for any facility upgrades needed at the SVP Switching Station as a result of the LECEF interconnection.
4) PG&E will engineer, procure materials for, construct, and own all facilities within Los Esteros Substation to interconnect SVP's 230 kV Switching Station into the existing Los Esteros 230 kV buses. This will include all protective relaying related to station protection and metering equipment. SVP and/or Calpine will be responsible for the costs associated with any facility upgrades needed at Los Esteros Substation as a result of the LECEF interconnection.
5) All planned generating facilities in Northern California whose schedules are concurrent with or precede the schedule for the LECEF connection into the SVP Switching Station were included in the study. These facilities are described in the section discussing the power flow base cases.
6) The study took into account all the approved PG&E transmission reliability projects that will be operational by 2008.

Power Flow Base Case Assumptions

Two power flow cases were used to evaluate the impacts of the proposed interconnection of the LECEF combined-cycle plant into the SVP 230 kV Switching Station in 2008. These base cases represent extreme loading and generation conditions for the North San Jose area. The SVP 60 kV system was modeled in these base cases.

1. 2008 Summer Peak Full-Loop Base Case:

Power flow analyses were performed using a 2008 Summer Peak Full-Loop Base Case, which was developed from PG&E's 2003 Assessment base case series. Area loads were developed using the latest information available to PG&E in early 2004, and the loads represent 1-in-10-year heat wave load levels for the South Bay area in Summer 2008. SVP peak load was assumed to be 469 MW. PG&E's North San Jose area distribution load was modeled at 491 MW.

2. 2008 Summer Off-Peak Full-Loop Base Case:

Power flow analyses were also performed using a 2008 Summer Off-Peak Full-Loop Base Case. Conforming load levels were reduced to approximately 50% from the levels shown in the Summer Peak Full-Loop Base Case, which is representative of early morning load levels on a summer peak day and non-summer weekdays.

These two cases were used to model the "Before Project" or "existing system" configuration (with LECEF connected to the Los Esteros-Nortech 115 kV line) and the "After Project" or "proposed system" configuration (LECEF connected to the SVP Switching Station). The SVP Switching Station is modeled in both configurations.

In the "existing system" configuration, LECEF generation will consist of four, simple-cycle CT's. All approved PG&E transmission reliability projects that are expected to be operational in the years prior to 2008 were included in the base cases. In the North San Jose area, the projects included the FMC Loop Project, the new Nortech-NRS 115 kV line and the reconductoring on the NRS-Scott 115 kV lines.

Generation projects that were approved by the CEC were also modeled in the existing system base cases. In the Greater Bay area, this includes:

SVP's Pico facility,
Calpine's Metcalf Energy Center,
Calpine's Russell City Energy Center,
Mirant's Potrero 7 Unit.

Appendix 1 lists the generation projects that were included in the base cases.

The "proposed system" configuration cases modeled LECEF as a single, 4x1 combined-cycle unit. LECEF was "disconnected" from the Los Esteros-Nortech 115 kV line and was connected into the SVP Switching Station through two 230/115 kV transformers.

Technical Study Scope

The specific technical studies that were conducted are outlined in this section. The four base cases were then used for the power flow, dynamic stability and the post-transient analyses.

Steady State Power Flow Analysis

The base cases were used to evaluate the existing system and proposed system configurations for normal operating conditions, as well as numerous single- and multiple-outage contingencies. Since the North San Jose area is a net import area, the study focused on the transmission facilities within the South Bay area (the SVP system and PG&E's

Peninsula, De Anza, Mission and San Jose Divisions).

The single (ISO Category "B") and selected multiple (ISO Category "C") contingencies evaluated in this study are listed in Appendix 2. These contingencies include the following outages:

ISO Category "B"

- All single generator outages within the South Bay area.
- All single transmission circuit outages within the South Bay area. This includes 500 kV, 230 kV and 115 kV circuits.
- All single transformer outages within the South Bay area.
- Overlapping single-generator and transmission circuit outages for the transmission lines and generators within the South Bay area.

ISO Category "C"

- Outages of double-circuit tower lines (115 and 230 kV) within the South Bay area.
- Combinations of two-component outages (generator, transmission line and transformer) within the South Bay area.
- Selected bus outages (115 and 230 kV) within the South Bay area.
- Outages caused by breaker failures (excluding bus-tie and bus-sectionalizing breakers) at the same bus section above.

System Protection Analysis

Short-circuit studies will be performed to determine the impact of increased fault duty resulting from the proposed arrangement. The study will determine the maximum fault currents in the vicinity of the proposed project, and it will identify equipment that becomes overstressed as a result of the proposed project.

Dynamic Stability Analysis

Although it is not expected that there are system stability problems as a result of the proposed connection of LECEF to the SVP Switching Station, dynamic stability studies will be conducted using the 2008 Summer Full-Loop Base Case to ensure that the transmission system remains in operating equilibrium through abnormal operating conditions. Selected disturbance simulations for critical local line outages will be performed for a study period of 20 seconds to determine whether the new facility will create any system instability.

Reactive Power Deficiency Analysis

Post-transient studies were not conducted as part of this interconnection study.

Transmission Line Cost Evaluation

PG&E did not develop any costs for transmission line work related to the proposed interconnection of the LECEF switchyard to the SVP Switching Station. It was assumed that

SVP and Calpine are completely responsible for all portions of the project related to the SVP Switching Station and the SVP 230 kV line.

PG&E's transmission line cost evaluation will identify upgrades to existing equipment required to mitigate overloading due to the proposed project, if any. However, the work scope and costs for these potential system impact upgrades will only be roughly estimated in this Study. Cost estimates for these potential upgrades will be provided on a +/- 50% basis.

Substation Cost Evaluation

PG&E evaluated the impacts of the proposed interconnection of Calpine's LECEF combined-cycle facility into the SVP 230 kV Switching Station on the reliability and operability of PG&E's Los Esteros Substation. When LECEF Phase 2 connects into the SVP 230 kV Switching Station in 2008, the Switching Station becomes a "collector station." As such, the interconnection configuration shown in Figure 1 must be modified, and the switches replaced with breakers. This is discussed in more detail below. Cost estimates for this conversion and any other upgrades are +/- 25%.

The substation cost evaluation will also identify any upgrades required to existing equipment to mitigate problems caused by overstress or overload due to the proposed SVP Switching Station interconnection. As with the transmission line cost evaluation, this portion of the substation cost evaluation will be provided on a +/- 50% basis.

Environmental Evaluation/ Permitting and Land Costs

This Study will assume that all transmission facility work associated with the proposed LECEF-SVP interconnection will be included in the CEQA filing on the project. SVP and/or Calpine will be responsible for the evaluation of all potential environmental impacts of the interconnection electric facility and make a finding of no significant unavoidable environmental impacts. It is also assumed that SVP and Calpine will be responsible for any land costs associated with this work.

Results of 2008 Summer Peak Power Flow Studies

The 2008 base cases developed to study the proposed interconnection of the LECEF Phase 2 Project into the SVP 230 kV Switching Station were evaluated for the Category B and C contingencies listed in Appendix 2. Detailed results of the power flow studies are presented in Appendices 5 and 6 for 2008 Summer Peak and Off-Peak conditions.

The 2008 Summer analyses found only two Category B overloads in the South Bay transmission system. Both overloads are present in the existing, pre-project system, and the 140 MW expansion of LECEF helps to slightly reduce those overloads. The overloads are on the Piercy-Metcalf 115 kV line and the Metcalf-Moss Landing 230 kV lines. PG&E already has projects to eliminate the overload problems on these lines. These projects are:

T692: Piercy/Swift-Metcalf and Newark-Dixon Landing 115 kV Line Reconductoring Project
T867: Metcalf-Moss Landing 230 kV Reinforcement Project.

Several Category C contingency overloads were found in the 2008 Summer analysis – in both pre-project and post-project power flow cases. (The entire list of Category C contingency overloads is given in Appendix 5.) Some of the more critical Category C contingency loadings are:

- Eastshore-San Mateo 230 kV lines @ 108% of emergency rating for the [L-2] outage of the Tesla-Ravenswood & Newark-Ravenswood 230 kV lines;
- Metcalf-Hicks and Metcalf-Vasona 230 kV lines at 110% and 108% for the [L-2] outage of the Metcalf-Monta Vista # 3 and MEC-Monta Vista 230 kV lines.
- Kifer 115/60 kV bank @ 124% of emergency rating for the [N-2] outage of the other Kifer 115/60 kV bank and the NRS-Tasman 60 kV line.
- NRS-Tasman 60 kV line @ 93% of emergency rating for an outage of the Kifer 115 kV bus.

For every Category C contingency overload, the LECEF Phase 2 generation lowered the amount of overload. The reduction was generally 1% to 2%.

Results of 2008 Summer Off-Peak Power Flow Studies

Appendix 6 has the results of the power flow analysis for the 2008 Summer Off-Peak conditions. With the much lower loads in the off-peak cases, there were practically no overload problems for any Category B or C contingencies.

Fault Duty Analysis

(This analysis is being completed at this time.)

Dynamic Stability Results

(Study results are being compiled at this time. No instabilities were found.)

Change in Interconnection Configuration

Per PG&E guidelines, the addition of the two LECEF connections into the SVP 230 kV Switching Station will require that the disconnect switches that connect the Los Esteros and Switching Station 230 kV buses be replaced with circuit breakers. Figure 5 shows the proposed interconnection scheme.

In order to accommodate the installation of the new circuit breakers and their associated disconnect switches, the Los Esteros fenceline will need to be moved to the south. The amount of additional space needed for these breakers is being determined at this time, and PG&E and SVP are discussing this issue.

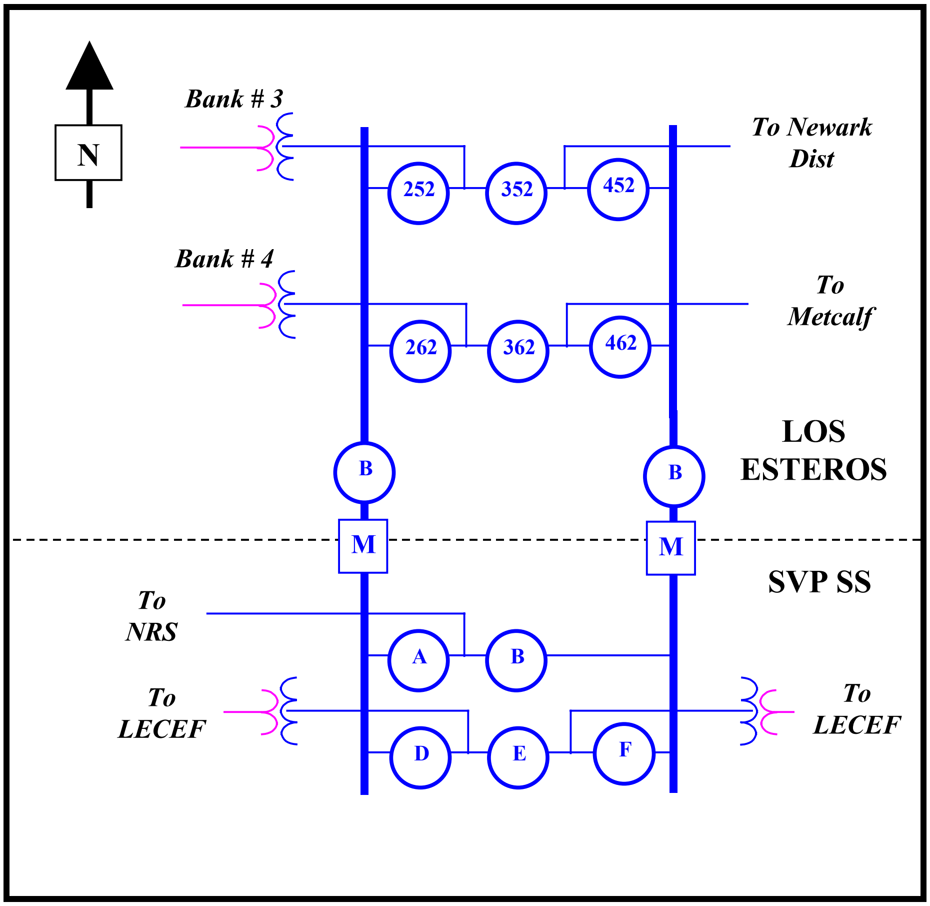


Figure 5: Proposed Connection of SVP Switching Station and LECEF to Los Esteros Substation

Interconnection Cost Estimates

(Interconnection costs are still being developed at this time.)

APPENDIX 1 – Generator Projects to be Modeled in Study

	PG&E Generation Projects	Latest Expected On-line Date	To Be Modeled in Study Case?
1)	Calpine – 600 MW Metcalf Energy Center (MEC), interconnecting at the Metcalf - Monta Vista #4 230 kV line, through the MEC switchyard.	2005	Yes
2)	Mirant – 590 MW Contra Costa Power Plant Capacity Increase Project, interconnecting at Contra Costa PP 230 kV bus.	2006	Yes
3)	FPLE - 1156 MW Tesla Generation Project Phase 1, interconnecting at the 230 kV bus at Tesla Substation.	2006	Yes
4)	Duke Energy North America - 1200 MW Morro Bay Modernization Project replacing the existing Morro Bay Power Plant.	2006	Yes
5)	Calpine – 1000 MW San Joaquin Valley Energy Center interconnecting in the Fresno area.	2006	Yes
6)	Mirant – 619 MW Potrero Unit 7 Project, interconnecting at Potrero Substations 115 kV bus.	2007	Yes
7)	Calpine – 620 MW Russell City Energy Center, interconnecting at the East Shore Substation 230 kV bus.	2006	Yes
8)	Duke – 620 MW Avenal Energy Center, interconnecting at Arco - Gates 230 kV line.	2006	Yes
9)	Los Esteros Critical Energy Facility, LLC – 62 MW project added to Los Esteros Critical Energy Facility, interconnecting at Los Esteros - 115 kV Bus.	2005	No
10)	SMUD - Solano County Wind Project 77 MW Wind Generation addition at Russell Substation in 2006	2006	Yes
11)	Los Esteros Critical Energy Facility - 335 MW project interconnected to SVP's 230 kV Switching Station in 2008	2008	Yes
12)	SMUD - Solano County Wind Project 15 MW Wind Generation addition at Russell Substation in 2006	2006	No
13)	SMUD - Solano County Wind Project 60 MW Wind Generation addition at Russell Substation in 2008	2008	No

	PG&E Generation Projects - ISO Generation Interconnection Queue	Latest Expected On-line Date	To Be Modeled in Study Case?
1)	Fresno Cogen Partners, LP - plan to increase the existing generation at their plant site. Interconnection point will tap Off PG&E's Kerman-Helm 70 kV line via Agrico Tap 70 kV.	2004	Yes
2)	Project G - 150 MW wind project interconnecting via a loop on the Vaca Dixon - Contra Costa #2 230 kV Line.	2005	Yes
3)	Global Renewable Energy Partners - Lompoc Wind Project 119 MW project interconnecting via a tap line onto PG&E's Divide – Cabrillo #2 115 kV line near Switch 115 near Cabrillo Substation.	2006	Yes
4)	Kings River Conservation District - 94.5 MW Project interconnecting to Malaga Substation 115 kV Bus in December 2004	2005	Yes
5)	Project I - 17.6 MW Wind Repowering at Elworthy Substation 230 kV Bus	2004	Yes
6)	S. F. Electric Reliability Project - 186.8 MW Project interconnecting via two tie lines to the Potrero Switchyard 115 kV bus in June 2005	2005	Yes
7)	Havoco Wind Energy, LLC - Buena Vista Energy Project - Repowering of an existing 38 MW wind project interconnecting via a tap on the Contra Costa - Delta Switchyard 230 kV Line in 2004	2004	Yes
8)	FPLE – 38 MW High Wind III, interconnecting at Vaca - Contra Costa #2 230 kV line in 2005.	2005	Yes
9)	Sonoma County Landfill Gas, Phase 3 - 1.6 MW Project interconnecting to the Fulton-Molino-Cotati 60 kV Line via the Washoe 60 kV Tap.	2004	Yes
10)	Sunrise Power Project 3B - This Project augments the existing Sunrise Power Project Capacity to 590 MW during Spring and Summer ambient conditions. This Project is interconnected via a non-PG&E Substation (La Paloma) to the Midway 230 kV Bus	2004	Yes
11)	Project J - 150 MW wind project interconnection at Russell Substation on the Vaca Dixon - Contra Costa #1 230 kV Line.	2007	Yes
	Non-PG&E Generation Projects to Be Modeled in Base Case per On-line Year	**On-line Date**	**To Be Modeled in Study Case?**
1)	Calpine – 1070 MW East Altamont Generating Project interconnecting at the Tracy - Westley 230 kV circuit near Tracy Substation.	2006	Yes
2)	SMUD - 500 MW project interconnecting at SMUD's Rancho Seco 230 kV bus.	2005	Yes
3)	Silicon Valley Power Pico Project- 120 MW project, interconnecting at Scott-Kifer 115kV line.	2005	Yes
4)	Turlock Irrigation District - 250 MW Project, interconnecting at TID's transmission system.	2006	Yes

APPENDIX 2 – Contingencies Evaluated in Study

1. Basecases to be Used

Four initial basecases were developed:

2008 Summer Peak (without LECEF Phase 2)
2008 Summer Peak (with LECEF Phase 2)
2008 Summer Off-Peak (without LECEF Phase 2)
2008 Summer Off-Peak (with LECEF Phase 2).

These cases were used as the starting points for the various contingency and transient stability studies to be conducted.

2. [G-1] Contingencies (ISO Category "B")

Seven generator contingencies were studied as part of this study. These contingencies apply to the generators in and around the San Jose transmission system. The [G-1] contingencies that were evaluated were:

1 [G-1] Pico Power Combined-Cycle Unit
2 [G-1] Metcalf Energy Center Combined-Cycle Unit
3 [G-1] Russell City Energy Center Combined-Cycle Unit
4 [G-1] CCA generator
5 [G-1] WPCP generator
6 [G-1] Calpine Agnews generator
7 [G-1] Gilroy Cogen generator.

The LECEF Project in the "existing system" configuration base cases is modeled as four, independent CTG's. In the "proposed system" configuration, LECEF Phase 2 is modeled as a single, 4x1 combined-cycle unit. An eighth generator contingency was developed to evaluate the system impact of the loss of the entire LECEF plant:

8 [G-1] One LECEF CTG in "existing system" cases, or
Entire Combined-Cycle Plant outage in "proposed system" configuration.

The ISO also requested that PG&E study the impact of not having peaker units available at Gilroy Energy Center. Two additional generator contingencies were developed:

9 [G-3] Three GEC peaker generators off-line
10 [G-4] Three GEC peaker generators and MEC Combined-Cycle Unit off-line.

This study also looked at the loss of the largest combined-cycle unit in the Greater Bay Area:

11 [G-1] Delta Energy Center Combined-Cycle Unit off-line.

3. [L-1] Contingencies (ISO Category "B")

Sixty-two single-line contingencies were evaluated as part of this study. The single-line contingencies fall into three categories:

South Bay Bulk Power Lines (500kV and 230kV)
San Jose 115kV and 60 kV Lines
SVP 60 kV Lines
DeAnza 115kV and 60 kV Lines.

The DeAnza 115kV line contingencies are being studied for completeness, since the San Jose 115kV system and the DeAnza 115kV system operate “in parallel,” and an outage within one system can slightly increase line flows in the other system.

The single-line contingencies were:

1 [L-1] Tesla-Metcalf 500kV Line
2 [L-1] Metcalf-Moss Landing 500kV Line
3 [L-1] Tesla-Newark 230kV Line # 1
4 [L-1] Tesla-Newark 230kV Line # 2
5 [L-1] Newark-Newark Distribution 230kV Line
6 [L-1] Newark Distribution-Los Esteros 230kV Line
7 [L-1] Los Esteros-Metcalf 230kV Line
8 [L-1] Los Esteros-Northern 230kV Line
9 [L-1] Metcalf-Hicks 230kV Line
10 [L-1] Metcalf-Vasona 230kV Line
11 [L-1] Vasona-Saratoga 230kV Line
12 [L-1] Metcalf-Monta Vista 230kV Line # 3
13 [L-1] Metcalf-MEC 230kV Line # 4
14 [L-1] MEC-Monta Vista 230kV Line # 4
15 [L-1] Metcalf-Moss Landing 230kV Line # 1
16 [L-1] Metcalf-Moss Landing 230kV Line # 2
17 [L-1] Tesla-Ravenswood 230kV Line
18 [L-1] Newark-Ravenswood 230kV Line
19 [L-1] Newark-Northern 115kV Line # 1
20 [L-1] Newark-Northern 115kV Line # 2
21 [L-1] Northern-Scott 115kV Line # 1
22 [L-1] Northern-Scott 115kV Line # 2
23 [L-1] Kifer-Pico 115kV Line # 1
24 [L-1] Pico-Scott 115kV Line # 1
25 [L-1] Nortech-NRS 115kV Line # 1
26 [L-1] Nortech-Los Esteros 115kV Line # 1
27 [L-1] Los Esteros-Trimble 115kV Line # 1
28 [L-1] Los Esteros-Agnew 115kV Line # 1
29 [L-1] Los Esteros-Montague 115kV Line # 1
30 [L-1] Newark-Dixon Landing 115kV Line # 1
31 [L-1] Trimble-Montague 115kV Line # 1
32 [L-1] Newark-Kifer 115kV Line # 1
33 [L-1] Newark-Trimble 115kV Line # 1
34 [L-1] Newark-Milpitas 115kV Line # 1
35 [L-1] Newark-Milpitas 115kV Line # 2
36 [L-1] Dixon Landing-McKee 115kV Line # 1
37 [L-1] Trimble-San Jose B 115kV Line # 1
38 [L-1] Kifer-FMC 115kV Line # 1
39 [L-1] FMC-San Jose B 115kV Line # 1
40 [L-1] San Jose B-San Jose A 115kV Line # 1
41 [L-1] San Jose A-El Patio 115kV Line # 1
42 [L-1] Metcalf-El Patio 115kV Line # 1

43 [L-1] Metcalf-El Patio 115kV Line # 2
44 [L-1] San Jose B-Evergreen 115kV Line # 1
45 [L-1] Swift-Metcalf 115kV Line # 1
46 [L-1] McKee-Piercy 115kV Line # 1
47 [L-1] Piercy-Metcalf 115kV Line # 1
48 [L-1] Milpitas-Swift 115kV Line # 1
49 [L-1] Metcalf-Evergreen 115kV Line # 2
50 [L-1] Metcalf-Evergreen 115kV Line # 1
51 [L-1] Metcalf-Edenvale 115kV Line # 1
52 [L-1] Metcalf-Edenvale 115kV Line # 2
53 [L-1] Newark-Lockheed1-Lawrence 115kV Line
54 [L-1] Newark-Lockheed2-AMD-AppMat 115kV Line
55 [L-1] Monta Vista-Philips-Lawrence 115kV Line
56 [L-1] Monta Vista-Britton 115kV Line
57 [L-1] Monta Vista-Los Gatos 60kV Line
58 [L-1] SVP NRS-Tasman 60kV Line
59 [L-1] SVP Homestead-Scott 60kV Line
60 [L-1] SVP Scott-Zeno 60kV Line
61 [L-1] SVP Kifer-Fiberglass 60kV Line
62 [L-1] SVP Kifer-CCA 60kV Line

4. [T-1] Contingencies (ISO Category "B")

Nineteen transformer contingencies were evaluated for this study. As with the line contingencies, Monta Vista 230/115 kV bank outages are being studied for completeness, since these transformers feed the DeAnza 115kV system. The single transformer contingencies were:

1 [T-1] Metcalf 500/230 kV Bank # 11
2 [T-1] Metcalf 500/230 kV Bank # 12
3 [T-1] Metcalf 500/230 kV Bank # 13
4 [T-1] Metcalf 230/115 kV Bank # 1
5 [T-1] Metcalf 230/115 kV Bank # 2
6 [T-1] Metcalf 230/115 kV Bank # 3
7 [T-1] Metcalf 230/115 kV Bank # 4
8 [T-1] Newark 230/115 kV Bank # 9
9 [T-1] Newark 230/115 kV Bank # 7
10 [T-1] Newark 230/115 kV Bank # 11
11 [T-1] Monta Vista 230/115 kV Bank # 2
12 [T-1] Monta Vista 230/115 kV Bank # 3
13 [T-1] Los Esteros 230/115 kV Bank # 3
14 [T-1] Los Esteros 230/115 kV Bank # 4
15 [T-1] Northern 230/115 kV Bank # 1
16 [T-1] LECEF-SVP Switching Station 230/115 kV Bank # 1
17 [T-1] Northern 115/60 kV Bank
18 [T-1] Scott 115/60 kV Bank
19 [T-1] Kifer 115/60 kV Bank

5. [G-1/L-1] Contingencies (ISO Category "B")

The sixty-two single-line contingencies listed in Section 3 were evaluated for each of the nine generator contingencies listed in Section 2 for both Summer Peak and Off-Peak cases.

6. [N-2] Contingencies (ISO Category "C")

[G-1/T-1] contingencies were run for all combinations of the [G-1] contingencies and the nineteen [T-1] contingencies.

Seventeen, DCTL [L-2] contingencies will be run as part of this study. These contingencies are:

1. [L-2] Tesla-Newark #1/Tesla-Ravenswood 230kV Lines
2. [L-2] Tesla-Newark #2/Los Esteros-Metcalf 230kV Lines
3. [L-2] Tesla-Ravenswood/Newark-Ravenswood 230kV Lines
4. [L-2] Newark Dist-Los Esteros/Metcalf-Los Esteros 230kV Lines
5. [L-2] Metcalf-Moss Landing 230kV Lines # 1&2
6. [L-2] Metcalf-Hicks/Metcalf-Vasona 230kV Lines
7. [L-2] Metcalf-Monta Vista 230kV Lines # 3&4
8. [L-2] Newark-Northern 115kV Lines # 1&2
9. [L-2] Northern-Scott 115kV Lines # 1&2
10. [L-2] Los Esteros-Trimble/Montague 115kV Lines
11. [L-2] Newark-Trimble/Kifer 115kV Lines
12. [L-2] Newark-Dixon Landing/Milpitas 115kV Lines
13. [L-2] Metcalf-El Patio 115kV Lines # 1&2
14. [L-2] Metcalf-Evergreen 115kV Lines # 1&2
15. [L-2] Swift/Piercy-Metcalf 115kV Lines
16. [L-2] Trimble/Kifer-San Jose B/FMC 115kV Lines
17. [L-2] Monta Vista-Lawrence/Britton 115kV Lines

For the non-DCTL [L-2] contingencies, only a select number of contingencies were studied. The focus was on selecting critical single-line contingencies in the San Jose transmission system. Then the complete list of sixty-two single-line contingencies were run on top of each critical single-line contingency. The critical line contingencies to be used are:

Tesla-Metcalf 500kV Line
Metcalf-Moss Landing 500kV Line
Tesla-Newark #1 230kV Line
Newark-Newark Dist. 230kV Line
Los Esteros-Metcalf 230kV Line
Metcalf-Vasona 230kV Line
Metcalf-MEC 230kV Line
Newark-Northern #2 115kV Line
Newark-Trimble 115kV Line
Newark-Dixon Landing 115kV Line
NRS-Scott #1 115kV Line
Los Esteros-Nortech 115kV Line
Los Esteros-Trimble 115kV Line
San Jose A-San Jose B 115kV Line
Evergreen-San Jose B 115kV Line
Metcalf-El Patio #1 115kV Line

Metcalf-Evergreen #2 115kV Line
Piercy-Metcalf 115kV Line

Since all of the critical transformers in the San Jose area are located in "multi-bank" stations, only five [T-1] contingencies will be selected for the [T-1/L-1] contingencies:

Metcalf 500/230 kV Bank # 13
Metcalf 230/115 kV Bank # 3
Newark 230/115 kV Bank # 11
Monta Vista 230/115 kV Bank # 2
Los Esteros 230/115 kV Bank # 3.

All sixty-two [L-1] and nineteen [T-1] contingencies were run for each [T-1] contingency listed above.

7. Bus Contingencies (ISO Category "C")

At this time, twenty-three bus contingencies will be studied. The most critical bus contingencies for the San Jose 115kV system were selected. There are no Los Esteros bus outages included, since the bus configuration at Los Esteros will be breaker-and-a-half for both the 115kV and 230kV. (The same is true of the proposed NRS 230kV bus.)

1 [B-1] Newark D1 230kV Bus Outage
2 [B-1] Newark D2 230kV Bus Outage
3 [B-1] Newark E1 230kV Bus Outage
4 [B-1] Newark E2 230kV Bus Outage
5 [B-1] Metcalf D1 230kV Bus Outage
6 [B-1] Metcalf D2 230kV Bus Outage
7 [B-1] Metcalf E1 230kV Bus Outage
8 [B-1] Metcalf E2 230kV Bus Outage
9 [B-1] Newark D1 115kV Bus Outage
10 [B-1] Newark D2 115kV Bus Outage
11 [B-1] Newark E1 115kV Bus Outage
12 [B-1] Newark E2 115kV Bus Outage
13 [B-1] Newark F1 115kV Bus Outage
14 [B-1] Newark F2 115kV Bus Outage
15 [B-1] Metcalf D2 115kV Bus Outage
16 [B-1] Metcalf E2 115kV Bus Outage
17 [B-1] Metcalf D1&E1 115kV Bus Outage
18 [B-1] San Jose B 115kV Bus Outage
19 [B-1] Trimble 115kV Bus Outage
20 [B-1] Northern #1 115kV Bus Outage
21 [B-1] Northern #2 115kV Bus Outage
22 [B-1] Scott 115kV Bus Outage
23 [B-1] Kifer 115kV Bus Outage

The three SVP Receiving Stations utilize a main-aux bus design. Except for Northern Receiving Station, there are no bus-tie breakers along the main 115 kV bus. (Northern has a 3000-Amp breaker separating the #1 and #2 buses.) So, at Scott and Kifer, a fault on the 115 kV main bus will clear all of the connections to that bus.

The bus connections "dropped" for each bus contingency are listed below:

Newark “D1” 230kV Bus Outage:
- Newark-Ravenswood 230kV Line
- 230/115 kV Bank # 9
- Tesla-Newark # 1 230kV Line
- 230kV Shunt Caps

Newark “D2” 230kV Bus Outage:
- Las Positas-Newark 230kV Line
- 230/115 kV Bank # 7
- Vineyard-Newark 230kV Line

Newark “E1” 230kV Bus Outage:
- 230/115 kV Bank # 11
- Tesla-Newark # 2 230kV Line
- SVC

Newark “E2” 230kV Bus Outage:
- Newark-Newark Dist. 230kV Line
- Tassajara-Newark 230kV Line
- Castro Valley-Newark 230kV Line

Newark “D1” 115kV Bus Outage:
- Moccasin Creek-Newark # 1 115kV Line
- Newark-Jarvis # 1 115kV Line
- 115/12 kV Bank # 3 (De-activate Load # 3)
- Newark-Scott # 1 115kV Line
- 115kV Shunt Caps

Newark “D2” 115kV Bus Outage:
- Moccasin Creek-Newark # 2 115kV Line
- Newark-Jarvis # 2 115kV Line
- 115/12 kV Bank # 4 (De-activate Load # 4)
- 115/60 kV Bank # 2
- Newark-Dumbarton 115kV Line

Newark “E1” 115kV Bus Outage:
- Newark-Fremont # 1 115kV Line
- Newark-Ames # 1 115kV Line
- Newark-Ames # 2 115kV Line

Newark “E2” 115kV Bus Outage:
- Newark-Fremont # 2 115kV Line
- Newark-Ames # 3 115kV Line
- Newark-Ames # 4 115kV Line

Newark “F1” 115kV Bus Outage:
- Newark-Scott # 2 115kV Line
- Newark-Lawrence 115kV Line
- Newark-Trimble 115kV Line
- Newark-Milpitas # 1 115kV Line

Newark "F2" 115kV Bus Outage:
- Newark-Kifer 115kV Line
- Newark-Applied Materials 115kV Line
- Newark-Dixon Landing 115kV Line
- Newark-Milpitas # 2 115kV Line

Metcalf "D1" 230kV Bus Outage:
- 230/115 kV Bank # 1
- Metcalf-Hicks 230kV Line
- 230kV Shunt Caps

Metcalf "D2" 230kV Bus Outage:
- 230/115 kV Bank # 4
- Los Esteros-Metcalf 230kV Line
- Metcalf-Vasona 230kV Line

Metcalf "E1" 230kV Bus Outage:
- 230/115 kV Bank # 2
- Metcalf-Moss Landing # 1 230kV Line
- Metcalf-Monta Vista # 3 230kV Line

Metcalf "E2" 230kV Bus Outage:
- 230/115 kV Bank # 3
- Metcalf-Moss Landing # 2 230kV Line
- Metcalf-Monta Vista # 4 230kV Line

Metcalf "D1" 115kV Bus Outage:
- Metcalf-El Patio # 2 115kV Line
- Metcalf-Edenvale # 1 115kV Line
- Metcalf-Morgan Hill 115kV Line

Metcalf "D2" 115kV Bus Outage:
- Metcalf-El Patio # 1 115kV Line
- Metcalf-Edenvale # 2 115kV Line
- Metcalf-Llagas 115kV Line

Metcalf "E1" 115kV Bus Outage:
- Metcalf-Evergreen # 1 115kV Line
- Swift-Metcalf 115kV Line
- Metcalf-Coyote Pump 115kV Line

Metcalf "E2" 115kV Bus Outage:
- Metcalf-Evergreen # 2 115kV Line
- Piercy-Metcalf 115kV Line

Northern 115kV Bus 1 Outage:
- Newark-NRS # 1 115kV Line
- NRS-Scott # 1 115kV Line

Nortech-NRS 115 kV Line
NRS 115/60 kV Bank

Northern 115kV Bus 2 Outage:
Newark-NRS # 2 115kV Line
NRS-Scott # 2 115kV Line
NRS 230/115 kV Bank
NRS 115/60 kV Bank

Scott 115kV Bus Outage:
NRS-Scott # 1 115kV Line
NRS-Scott # 2 115kV Line
Scott-Pico 115kV Line
Both Scott 115/60 kV Banks

Kifer 115kV Bus Outage:
Kifer-Pico 115kV Line
Newark-Kifer 115kV Line
Kifer-FMC 115kV Line
Both Kifer 115/60 kV Banks

Trimble 115kV Bus Outage: (ISOLATE BUS)
Los Esteros-Trimble 115kV Line
Newark-Trimble 115kV Line
Trimble-Montague 115kV Line
Trimble-San Jose B 115kV Line

San Jose B "D" 115kV Bus Outage: (ISOLATE BUS)
Trimble-San Jose B 115kV Line
FMC-San Jose B 115kV Line
De-activate Loads # 1 & 4
Open connection to "E" Bus Section (Breaker # 162)

8. Breaker Failure Contingencies (ISO Category "C")

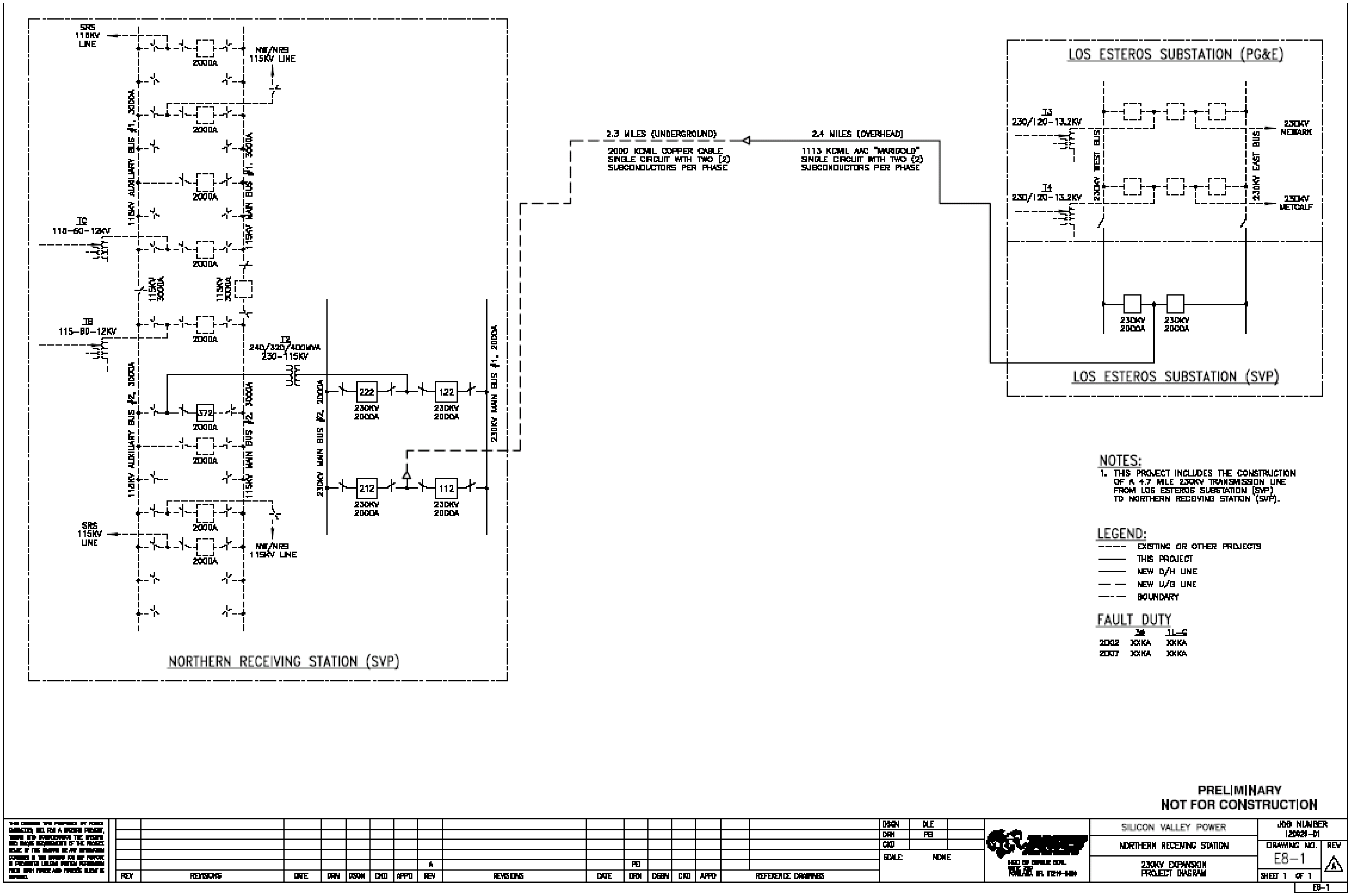
Excluding the bus-tie and bus-sectionalizing breakers, there do not appear to many breaker-failure contingencies in the San Jose 115kV system that are worse than the bus-fault contingencies mentioned above. Most of the critical substations within the San Jose area are designed as

Main-Aux Buses or
Double-Bus / Single-Breaker.

The only breaker-failure contingencies that will be analyzed as part of this Study are [N-2] contingencies involving equipment at Los Esteros. Both the 230kV and the 115kV buses at Los Esteros are breaker-and-a-half design. The contingencies to be studied will involve connections into the same substation bay:

Los Esteros-Metcalf 230kV Line & Los Esteros Bank # 1
Newark-Los Esteros 230kV Line & Los Esteros Bank # 2
Los Esteros-Agnews 115kV Line & Los Esteros Bank # 1
Los Esteros-Montague 115kV Line & Los Esteros Bank # 2

APPENDIX 3 – Schematic of Original Connection of SVP Switching Station into Los Esteros Substation



APPENDIX 4 – Calpine LECEF Interconnection into SVP 230 kV Switching Station

Figure 1.1-4. Architectural rendering of LECEF Phase 2.

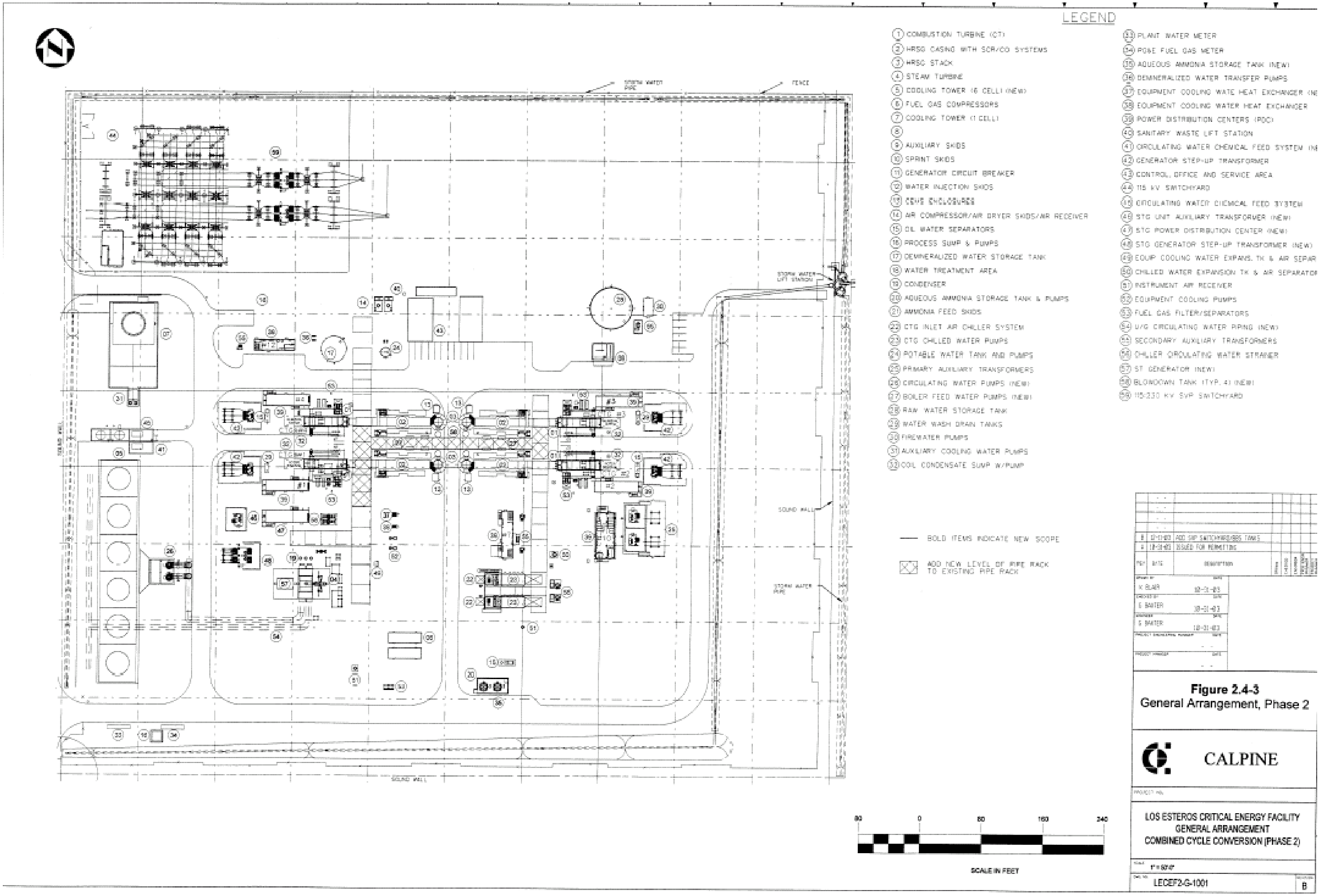


Figure 2.4-3
General Arrangement, Phase 2

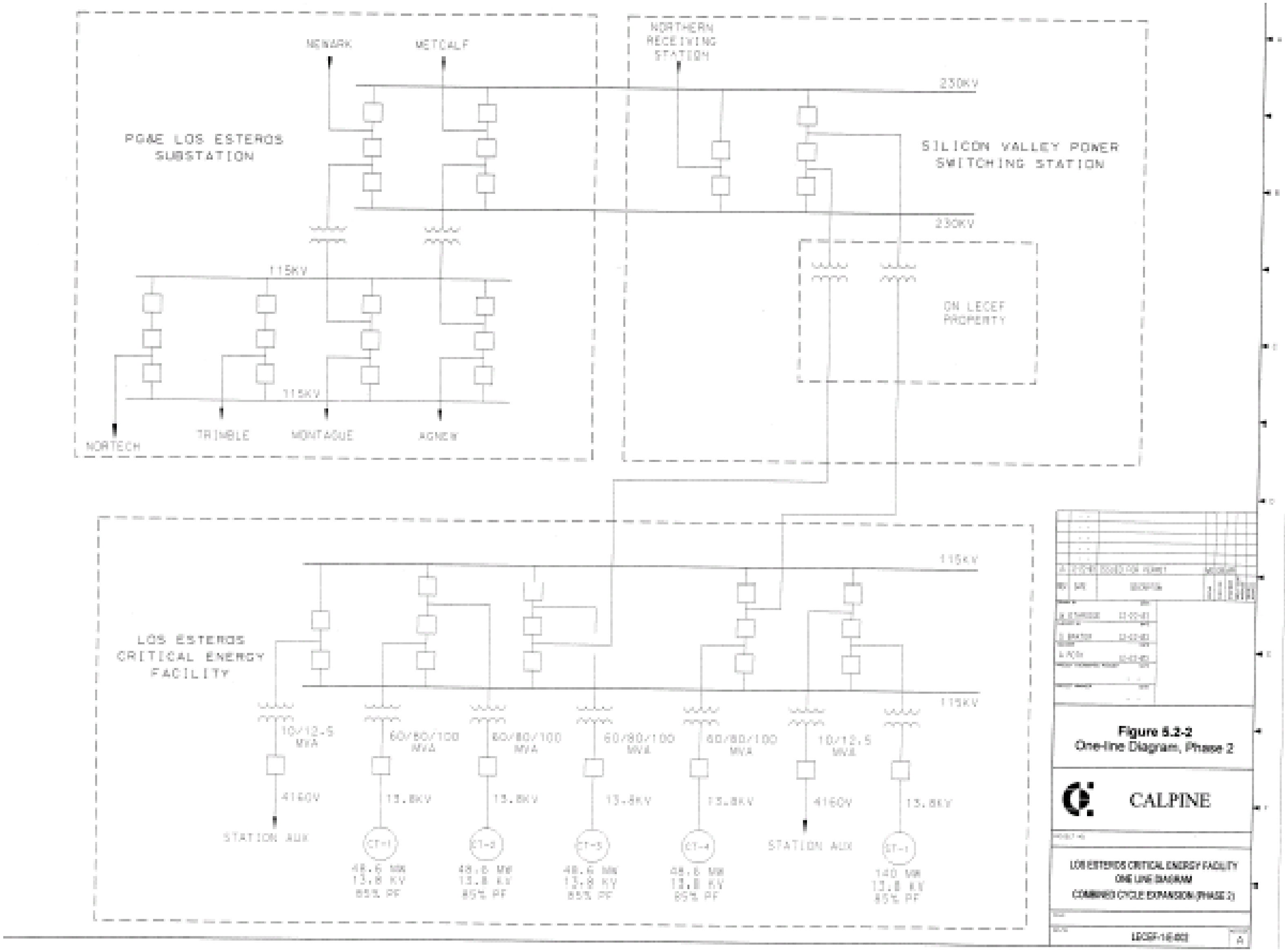


Figure 5.2-2
One-line Diagram, Phase 2

APPENDIX 5 – Detailed Results of 2008 Summer Peak Power Flow Studies

Below are the results for the 2008 Summer Peak case studies. In both the Before Project and After Project cases, there are overloads on the 60 kV system between Monta Vista and Evergreen Substations. (For example, Monta Vista 230/60 kV Bank # 5 has a 3% normal overload in both cases.) Since the 60 kV system is radially fed from Monta Vista and Evergreen, and the 60 kV loadings are unaffected by the proposed LECEF project, these overloads will not be presented below.

NORMAL OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of Normal Rating)	AFTER PROJECT Loading (% of Normal Rating)	Contingency Causing Overload
(None)	---	---	(None)

SINGLE GENERATOR OUTAGE [G-1] OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of Normal Rating)	AFTER PROJECT Loading (% of Normal Rating)	Contingency Causing Overload
(None)	---	---	(None)

SINGLE CONTINGENCY: LINE OUTAGE [L-1] AND TRANSFORMER OUTAGE [T-1] OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of Emergency Rating)	AFTER PROJECT Loading (% of Emergency Rating)	Contingency Causing Overload
Piercy-Metcalf 115 kV Line	105%	104%	Newark-Dixon Landing 115 kV Line

ONE GENERATOR (PICO COMBINED-CYCLE UNIT) OUT AND LINE OUTAGE [G-1/L-1] OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of Emergency Rating)	AFTER PROJECT Loading (% of Emergency Rating)	Contingency Causing Overload
Piercy-Metcalf 115kV Line	105%	104%	Pico Combined-Cycle Unit Out Newark-Dixon Landing 115kV Line

ONE GENERATOR (METCALF ENERGY CENTER COMBINED-CYCLE UNIT) OUT AND LINE OUTAGE [G-1/L-1] OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of Emergency Rating)	AFTER PROJECT Loading (% of Emergency Rating)	Contingency Causing Overload
Metcalf-Moss Landing 230 kV Lines	100%	98%	MEC Combined-Cycle Unit Out Moss Landing-Metcalf 500 kV Line
Piercy-Metcalf 115 kV Line	106%	105%	MEC Combined-Cycle Unit Out Newark-Dixon Landing 115 kV Line

ONE GENERATOR (RUSSELL CITY ENERGY CENTER COMBINED-CYCLE UNIT) OUT AND LINE OUTAGE [G-1/L-1] OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of Emergency Rating)	AFTER PROJECT Loading (% of Emergency Rating)	Contingency Causing Overload
Metcalf-Moss Landing 230 kV Lines	95%	< 93%	RCEC Combined-Cycle Unit Out Moss Landing-Metcalf 500 kV Line
Piercy-Metcalf 115 kV Line	105%	104%	MEC Combined-Cycle Unit Out Newark-Dixon Landing 115 kV Line

ONE GENERATOR (CCA UNIT) OUT AND LINE OUTAGE [G-1/L-1] OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of Emergency Rating)	AFTER PROJECT Loading (% of Emergency Rating)	Contingency Causing Overload
Piercy-Metcalf 115 kV Line	105%	104%	CCA Unit Out Newark-Dixon Landing 115 kV Line

ONE GENERATOR (WPCP UNIT) OUT AND LINE OUTAGE [G-1/L-1] OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of Emergency Rating)	AFTER PROJECT Loading (% of Emergency Rating)	Contingency Causing Overload
Piercy-Metcalf 115 kV Line	105%	104%	WPCP Unit Out Newark-Dixon Landing 115 kV Line

ONE GENERATOR (AGNEWS COGEN UNIT) OUT AND LINE OUTAGE [G-1/L-1] OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of Emergency Rating)	AFTER PROJECT Loading (% of Emergency Rating)	Contingency Causing Overload
Piercy-Metcalf 115 kV Line	105%	104%	Agnews Unit Out Newark-Dixon Landing 115kV Line

ONE GENERATOR (GILROY COGEN UNIT) OUT AND LINE OUTAGE [G-1/L-1] OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of Emergency Rating)	AFTER PROJECT Loading (% of Emergency Rating)	Contingency Causing Overload
Piercy-Metcalf 115 kV Line	105%	104%	Agnews Unit Out Newark-Dixon Landing 115 kV Line

ONE GENERATOR (LECEF GENERATION) OUT AND LINE OUTAGE [G-1/L-1] OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of Emergency Rating)	AFTER PROJECT Loading (% of Emergency Rating)	Contingency Causing Overload
Piercy-Metcalf 115 kV Line	105%	104%	LECEF Generator(s) Out Newark-Dixon Landing 115 kV Line

ONE GENERATOR (GILROY PEAKER GENERATION) OUT AND LINE OUTAGE [G-1/L-1] OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of Emergency Rating)	AFTER PROJECT Loading (% of Emergency Rating)	Contingency Causing Overload
Piercy-Metcalf 115 kV Line	105%	104%	Gilroy Peaker Generators Out Newark-Dixon Landing 115 kV Line

GILROY PEAKER AND MEC GENERATION OUT AND LINE OUTAGE [G-1/L-1] OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of Emergency Rating)	AFTER PROJECT Loading (% of Emergency Rating)	Contingency Causing Overload
Metcalf-Moss Landing 230 kV Lines	99%	98%	Gilroy Peakers and MEC Out Moss Landing-Metcalf 500 kV Line
Piercy-Metcalf 115 kV Line	106%	105%	Gilroy Peakers and MEC Out Newark-Dixon Landing 115 kV Line

DEC GENERATION OUT AND LINE OUTAGE [G-1/L-1] OVERLOADS

	BEFORE PROJECT	AFTER PROJECT	

Overloaded Component	Loading (% of Emergency Rating)	Loading (% of Emergency Rating)	Contingency Causing Overload
Piercy-Metcalf 115 kV Line	105%	104%	DEC Out Newark-Dixon Landing 115 kV Line

ONE GENERATOR AND ONE TRANSFORMER OUTAGE [G-1/T-1] OVERLOADS

There were no [G-1/T-1] overloads for any of the generator outages studied

DOUBLE-CIRCUIT TOWERLINE OUTAGE [L-2] OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of Emergency Rating)	AFTER PROJECT Loading (% of Emergency Rating)	Contingency Causing Overload
Eastshore-San Mateo # 1 & 2 230 kV Lines	108%	107%	Tesla-Ravenswood 230 kV Line Newark-Ravenswood 230 kV Line
Metcalf-Hicks 230 kV Line Metcalf-Vasona 230 kV Line	111% 108%	110% 107%	Metcalf-Monta Vista #3 230 kV Line MEC-Monta Vista 230 kV Line
Piercy-Metcalf 115 kV Line	105%	104%	Newark-Dixon Landing 115 kV Line Newark-Milpitas # 1 115 kV Line

OTHER CATEGORY C OUTAGE [N-2] OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of	AFTER PROJECT Loading (% of	Contingency Causing Overload

	Emergency Rating)	Emergency Rating)	
Piercy-Metcalf 115 kV Line	105%	104%	Newark-Dixon Landing 115 kV Line (Any other transmission component)
Kifer 115/60 kV Bank	124%	124%	NRS-Tasman 60 kV Line Other Kifer 115/60 kV Bank
Metcalf-Moss Landing # 1 & 2 230 kV Lines	127%	123%	Moss Landing-Metcalf 500 kV Line Tesla-Metcalf 500 kV Line
Metcalf-Moss Landing 230 kV Line	116%	113%	Moss Landing-Metcalf 500 kV Line Metcalf-Moss Landing 230 kV Line
Metcalf-Hicks 230 kV Line	113%	111%	Metcalf-Vasona 230 kV Line MEC-Monta Vista 230 kV Line
Piercy-Metcalf 115 kV Line	105%	104%	Newark-Dixon Landing 115 kV Line (Any other transmission component)

SINGLE BUS OUTAGE [B-1] OVERLOADS

Overloaded Component	BEFORE PROJECT Loading (% of Emergency Rating)	AFTER PROJECT Loading (% of Emergency Rating)	Contingency Causing Overload
Newark-Fremont # 2 115 kV Line	101%	100%	Newark 115 kV Bus “E1”
Newark-Fremont # 1 115 kV Line	101%	100%	Newark 115 kV Bus “E2”
Piercy-Metcalf 115kV Line	105%	104%	Newark 115kV Bus “F2”
Morgan Hill-Llagas 115 kV Line	102%	102%	Metcalf 115kV Bus “D1”
NRS-Tasman 60 kV Line	93%	< 93%	Kifer 115kV Bus

APPENDIX 6 – Detailed Results of 2008 Summer Off-Peak Power Flow Studies

For the 2008 Summer Off-Peak case studies, there were no equipment loadings higher than 93% of normal rating. There were also no Category B loadings more than 93% of emergency rating. For the [N-2] Category C contingencies studied, there were also no loadings more than 93% of emergency rating.

SINGLE BUS OUTAGE [B-1] OVERLOADS

There were high loadings found on the 115 kV lines out of Llagas Substation for Metcalf 115 kV bus outages. These are due to the high level of Gilroy generation assumed on-line in the base cases (both the Cogen unit and the GEC peakers are assumed to be on-line).

Overloaded Component	BEFORE PROJECT Loading (% of Emergency Rating)	AFTER PROJECT Loading (% of Emergency Rating)	Contingency Causing Overload
Morgan Hill-Llagas 115 kV Line	133%	133%	Metcalf 115kV Bus "D1"
Metcalf-Llagas 115 kV Line	100%	100%	Metcalf 115kV Bus "D2"

APPENDIX 7 – Calpine LECEF Steam Turbine-Generator Data

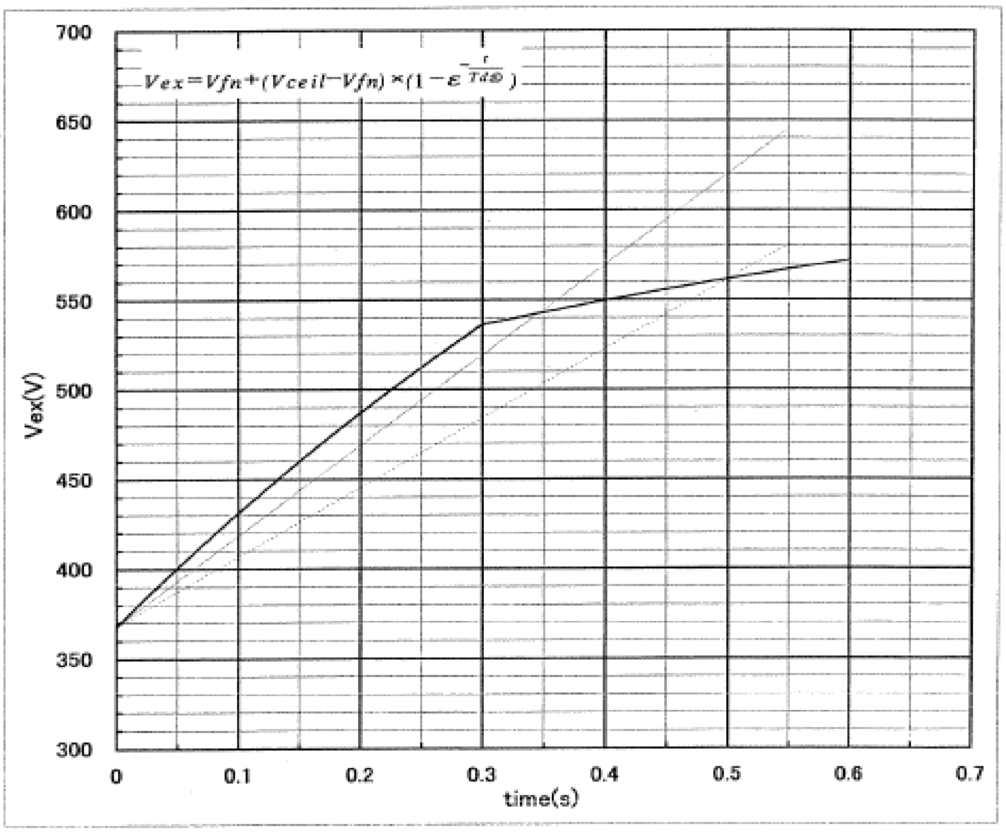
Work.No. K1Z69070L1

Calculated Response Ratio

Vfn(V)=	*Vceil(V)=*	~~*Tdz'(s)=*~~ Tdz'	*t1(s)*	*Ceiling (p.u)*	*t2(s)*	初期突上電圧	初期突上時間
368	650	0.79	0	1.7663	0.5	900	0.3

S1=	63.08	S2=	48.39
0	368.0 (V)	0	368.0
0.5	620.3 (V)	0.5	561.6

Vex : Exciter terminal voltage (V)
Vfn : Exciter rated voltage (V)
Vceil : Exciter ceiling voltage (V)
Tdz' : Exciter time-constant(s)



ΔV1= 252. 3 (V)
ΔV2= 193.6 (V)

Say 1.2 (S)

Calculated Response Ratio= 1. 37 (-s) by ΔV1
1. 05 (-s) by ΔV2

Calculated Response time= 1.95 (s)

Ceiling 1.7 p.u

Ifn = 33.9A , Vfn = 213.6 V

PMG OK.

データの修正・追加（ギッターコイル）

	電算値		修正·追加			
R1/20	0.00125 Ω	→	0.00119	Ω	=0.95*R/20	実績整合
X1S (G)			0.1373	PU	=0.9*X1S	SRB80-27a
XD''	0.2516 PU	→	0.2144	PU	=X1S+(0.5*A1N/B1N)	SRB80-27a
XD'' (G)	0.2038 PU	→	0.1737	PU	=0.81*XD''	SRB80-27a
X2			0.2251	PU	=1.05*XD''	SRB80-27a
X2 (G)			0.1824	PU	=1.05*XD'' (G)	SRB80-27a
XQ			2.0891	PU	=0.95*XD	SRB80-27a
XQ (G)			1.843	PU	=0.95*XD (G)	SRB80-27a
XQ'			0.4994	PU	=X1S+(2.8*A1N/B1N)	SRB80-27a
XQ' (G)			0.4842	PU	=X1S (G)+(2.8*A1N/B1N)	SRB80-27a
XQ''			0.2358	PU	=1.1*XD''	SRB80-27a
XQ'' (G)			0.1911	PU	=1.1*XD'' (G)	SRB80-27a
TDO' (75℃)	7.06 SEC	→	8.26	SEC	=1.17*TDO'	実績整合
TD'' (75℃)	0.04 SEC	→	0.03	SEC	=0.03	SRB80-27a
Tqo' (75℃)			2.5	SEC	const	SRB80-27a
Tqo" (75℃)			0.15	SEC	const	SRB80-27a
Tq' (75℃)			0.6	SEC	=Tqo'*XQ'/XQ	SRB80-27a
Tq' (G) (75℃)			0.66	SEC	=Tqo' (G)*XQ' (G)/XQ (G)	SRB80-27a
Tq'' (75℃)			0.07	SEC	=Tqo"*XQ''/XQ'	SRB80-27a
Tq'' (G) (75℃)			0.06	SEC	=Tqo" (G)*XQ'' (G)/XQ' (G)	SRB80-27a
MS	353.67 T-M	→	415.03	T-M	=MS*XD'' (電算)/XD'' (修正)	

温度換算	換算温度						
TDO'	95	℃	→	7.759	SEC	=TDO' (75℃)*(235+75)/(235+95)	温度換算 ∝ (1/R)
TDO"	95	℃	→	0.04	SEC	=TD''*XD'/XD''	
TD'	95	℃	→	0.902	SEC	=TD' (75℃)*(235+75)/(235+95)	温度換算 ∝ (1/R)
TD''	95	℃	→	0.03	SEC	=0.03	const. 0.03
TA	95	℃	→	0.497	SEC	=TA (75℃)*(235+75)/(235+95)	温度換算 ∝ (1/R)
R2	125	℃	→	~~0.412~~	Ω	0.3986 (SK64 Test より)	
PVCU1	95	℃	→	201	kW		
PVCU2	95	℃	→	345	kW		
PVZ				407	kW	=*1.1	

Damping factor	CD/ωn	0.1458	p.u
Damping coefficient	CD	54.97	pu-sec/rad electric
		0.96	pu-sec/deg electric
D.C (Mechanical)		1.00	pu-sec/rad electric
–		0.02	pu-sec/deg electric

R0	95	℃	→	0.00172	PU
R1	95	℃	→	0.00386	PU
P2			→	6699.4	kW
R2	95	℃	→	0.04251	PU

回転子巻線対地静電容量

F_{N2N}	(大スロット)	7600.416	cm^2	$=2*(b+h)*(Lr+\Delta Lr)$	b=0	KRD-R32-005b
F_{N2A}	(小スロット)	5191.584	cm^2	$=2*(b+h)*(Lr+\Delta Lr)$	b=0	
C_2		0.5912	μF	$=\varepsilon*\varepsilon_0/d_2*(F_{N2N}*N_{2N}+F_{N2A}*N_{2A})$		

3相交流同期・発電機（円筒形）		RPK番号	35538	機　種	火力
注文主	住友商事㈱経由 Calpine	電気設計仕様書 （試　験） P. 3/3		納　期	2002 年 01 月
最終需要家	Calpine Calgary Energy Center (ｶﾅﾀﾞ)			台　数	1
規　格	ANSI C50.13			製　番	K1Z69070L1
形　式	GTLRI544/60-2			機　番	K1Z69070L1

出力 157600 KVA　電圧 13800 V　電流 6594 A　力率 0.85　回転速度 3600 rpm　周波数 60 Hz　極数

励磁電流 (945) A　励磁電圧 405 V　定格 連続　励磁方式 ブラシレス励磁　絶縁固定子巻線 F 種　回転子巻線 F 種

冷媒温度 43 ℃　冷媒 空気　冷却水入口温度 35 ℃　冷媒圧力 －　冷却方式 －　保護方式

起動方式	――	起動抵抗	――

工場試験　　有

現地試験・特殊試験要求

			設計値	保証値	
空　隙			60 mm	－ mm	－
抵抗	電機子巻線 20℃		3×0.00119 Ω	－ Ω	－
	界磁巻線 20℃		0.276 Ω	－ Ω	－
波形	狂い率（無負荷）		－ %	－ %	－
	バランスTIF		－	≦40	－
	残留成分TIF		－	≦30	－
励磁電流	無負荷	0.5V	147 A	－ A	－
		1.0V	332 A	－ A	－
		1.1V	408 A	－ A	－
		1.2V	529 A	－ A	－
	短　絡		645 A	－ A	－
	全負荷		945 A	－ A	－
短絡比			0.516	(0.5)	－
固有電圧変動率		1.0pf	31 %	－ %	－
		0.85 pf	39 %	－ %	－
温度上昇	電機子巻線ETD		64 deg	≦67 deg	現地における保証値
			62 deg	≦66.3 deg	工場試験における 〃
	界磁巻線		71 deg	≦82 deg	現地における保証値
			65 deg	≦81.2 deg	工場試験における 〃
	－		－ deg	－ deg	－
風　量			50.0 m^3/s	－ m^3/s	－
温度上昇補正			無		

絶縁耐力	電機子巻線	28600 V／ 1 min		
	界磁巻線	4050 V／ 1 min		

			設計値	保証値	
損失	Exciter機械損		50 kW	－ kW	－
	軸受損		120 kW	－ kW	－
	風損		940 kW	－ kW	－
	鉄損		347 kW	－ kW	－
	電機子抵抗損		200 kW	－ kW	－
	漂遊負荷損		407 kW	－ kW	－
	界磁抵抗損		319 kW	－ kW	－
	Exciter電気損		16 kW	－ kW	－
効率 %	力率	負荷率	100% = 157600 KVA		
	0.85 / 1.0	100 %	98.24 / 98.58	(98.24) / －	間保証値:98.
		75 %	98.03 / 98.39	(98.05) / －	間保証値:97.
		50 %	97.46 / 97.90	(97.50) / －	－
		25 %	95.52 / 96.22	－ / －	－
		－	－ / －	－ / －	－
効率算定条件			Exciter機械損 含　Exciter電気損 含		－
起動電流			－ %	－ %	－
起動トルク			－ %	－ %	－
脱出トルク			－ %	－ %	－
引込トルク			－ %	－ %	－
界磁誘起電圧			－ V	－ V	－

諸定数		不飽和値 %							飽和値 %					時定数 sec			
		Xd'	Xd"	Xq	Xq"	X2	X0	Xd	Xd	Xd'	Xd"	Xp	X2	Ta	Tdo'	Td"	Td'
	設計値	30	21	209	24	23	11	220	194	27	17	25	18	0.5	7.76	0.03	0.9
	保証値	－	－	－	－	－	－	－	－	－	－	－	－	－	－	－	－
	電圧(%)温度上昇	－	－	－	－	－	－	－	－	－	－	－	－	95 ℃	95 ℃	95 ℃	95 ℃

注　1）　保証値に（　）を付けてあるものは、参考値として顧客に提出した値。（保証値ではない）

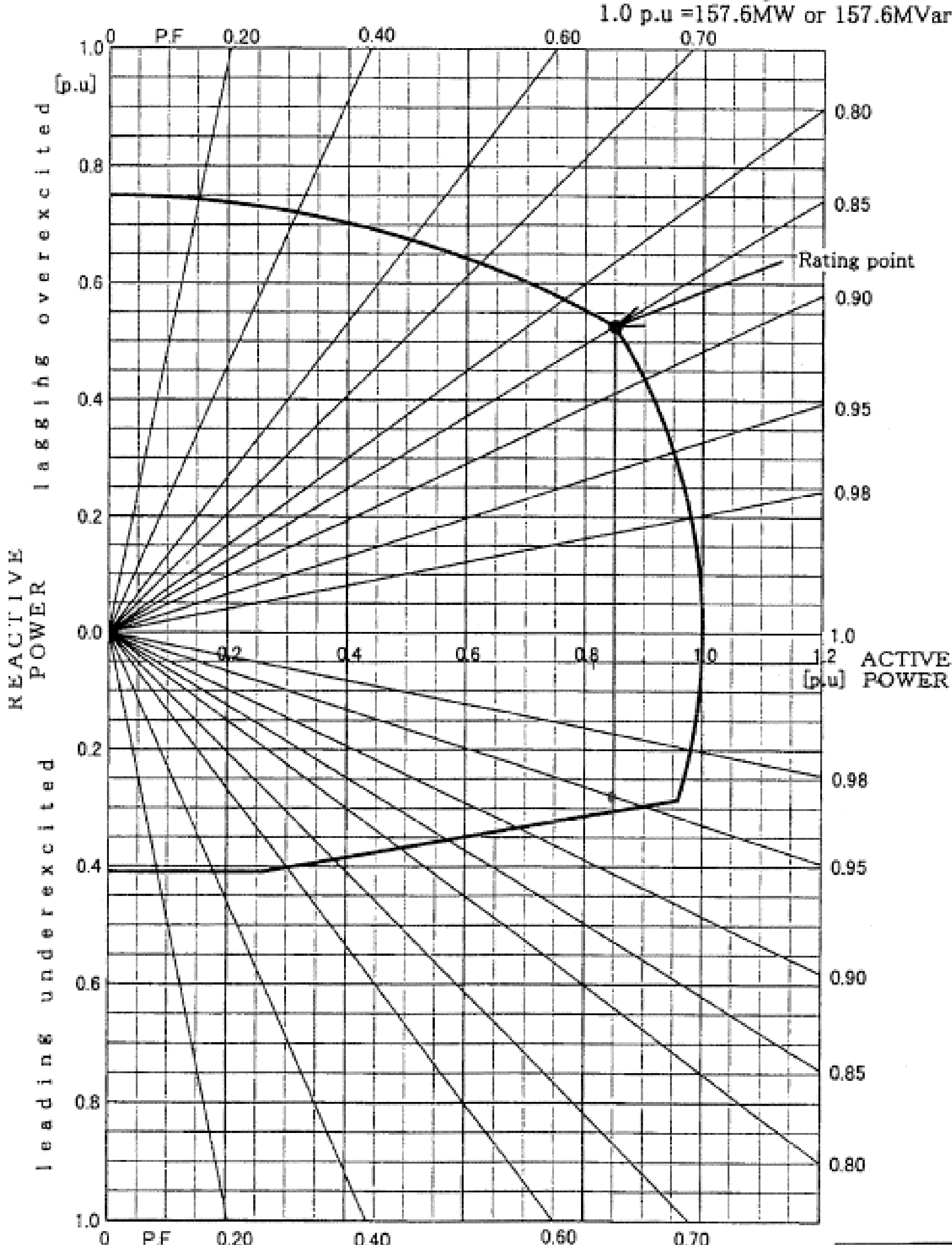
　　2）　RPK発行後の参考値の変更については、Additionを発行しない。

Generator Capability Curve (Generator only)

Generator output	157.6 MVA
Armature voltage	13.8 kV
Armature current	6594 A
Power factor	0.85 p.f
Frequency	60 Hz
Speed	3600 r/min

FOR PRELIMINARY INFORMATION

Coolant air temperature=43℃
1.0 p.u =157.6MW or 157.6MVar



MI13-1000

Technical Area: Visual Resources (47-54)

KOP-1 Simulations

47. Using AFC Figure 8.13-2b (KOP 1 – Simulation with Phase 2 Installed) as a base image, please provide visual simulations of Phase 2 of the project with the existing landscaping shown after 5 and 20 years of growth. Please provide 11" x 17" color photocopies (and electronic files) of the new images at "life-size scale" when viewed at a standard reading/viewing distance of 18 inches.

Response: Revised simulations showing the project with landscaping at 5 and 20 years of growth are attached at the end of this section (Attachment VIS-1).

Growth Rate Assumptions

48. Please provide the growth rate assumptions used, and the source of the assumptions, for all of the tree species depicted in the visual simulations.

Response: Attachment VIS-2 at the end of this section is a table listing the growth rate assumptions for the landscaping plants that have been installed around the LECEF power plant as well as on the berm southwest of the plant. This is the table that was submitted to the CEC during the Phase 1 compliance phase (Condition of Certification VIS-3). The source of these growth rate assumptions is MPA Design, the landscape architect for the LECEF landscaping plan.

Cooling Tower Shapes

49. Please discuss what is being depicted by the row of square shapes along the upper portion of the six-cell cooling tower.

Response: The row of square shapes along the upper portion of the six-cell cooling tower depicts air intake vents associated with the cooling tower's plume-abatement technology, similar to that used for the existing one-cell cooling tower.

Cooling Tower Treatment

50. Please discuss feasible design treatments that could be applied to the façade of the cooling tower that would reduce the visual monotony and apparent scale of the structure and improve its appearance, consistent with City of San Jose General Plan Policy 4. For example, Silicon Valley Power proposed alternating, horizontal bands of color on the façade of the Pico Power Project cooling tower to break up the mass of the tower. Any proposed color scheme should increase visual variety and reduce the size of areas of uninterrupted uniform color or texture, without creating distracting levels of contrast.

Response: The measures incorporated in fulfillment of CEC Conditions of Certification for Phase 1 provide significant screening of the facility to reduce the potential visual impact. A 12-foot-high sound absorption, landscaping, and screening wall has been constructed around the plant. This wall includes a 4-foot-high redwood lattice mounted on top of 8-foot-high precast concrete panels. Landscaped berms have been constructed along the south and east sides of the LECEF, of which the former will substantially screen views from SR 237. Trees planted on the berms include native evergreen oaks and redwoods, species that will grow to 50-60 feet in height and more. Landscape planting has also been installed along the west side to screen portions of the facility and reduce potential visual impact from Zanker Road. In addition, per the recommendation of the Architectural Committee during the construction of Phase 1 (see Condition of Certification VIS-7), a large berm has been constructed next to SR 237 southwest of LECEF and has been planted with coast live oak trees, specifically to block views of the plant from SR 237 to the southwest. Furthermore, cottonwood trees planted by Caltrans within the SR 237 to Zanker Road interchange have grown considerably, also screening views of LECEF from SR 237 eastbound. Since the proposed Phase 2 cooling tower will be located behind the architectural soundwall and landscaping and is similar in height to the existing cooling tower (and significantly shorter than the HRSGs and stacks), it will be substantially screened from Highway 237, (KOP-1) and Zanker Road (KOP-2) as the landscaping matures. Also, note that the landscaping will have a nearly four years of growth by the time Phase 2 is completed. Therefore, no further design treatments are proposed.

The plume-abatement air intake vents on the new six-cell cooling tower will sufficiently break up the mass of the cooling tower façade. They will do so in two ways: 1) the vents extend outward from the cooling tower for a sculptural effect that also introduces a changing shadow, and 2) the vents will appear to be a slightly different color than the cooling tower façade, since they area pitched at a slightly different angle. This will be sufficient to provide visual relief to any viewers who happen to see the cooling tower when travelling on either Zanker Road or State Route 237 from the few viewpoints that are not screened by landscaping. From the Zanker Road overpass, as the revised KOPs show, the cooling tower will not be visible due to the landscape berm and the landscaping trees.

Cooling Tower Design

51. *Please depict the design proposed by the Applicant to comply with General Plan Policy 4 in the simulations requested above in Data Request 46 and in a revised simulation for KOP 2 (AFC Figure 8.13-3b).*

Response: The Applicant does not propose additional design measures for the cooling tower, since the landscaping provides adequate screening from key viewpoints and since the plume abatement air intake vents provide sufficient relief in form and color to break up the mass of the cooling tower façade. Therefore, the cooling tower will appear much as it does in the existing KOP-2, except that landscape screening will grow along the western side of the power plant soundwall and will screen much of the cooling tower and other plant elements.

Fogging Frequency Curves

52. *Please provide two fogging frequency curves for the plume abated cooling tower; the first for a 100% turbine load condition (all turbines firing), and the second for a 100% turbine load condition plus maximum duct firing (all turbines/duct burners firing).*

Response: The fogging frequency curves are attached (Attachment VIS-3).

HRSG Plume Reduction Technology

53. *Please provide a description of the turbine/HRSG plume reduction technology that will be employed to comply with the City of San Jose's requirement to use best commercially feasible available technology for plume visibility reduction.*

Response: Plumes would form over the HRSG stack only under very rare circumstances. The Applicant has applied the best commercially feasible available technology for visible plume reduction for the cooling tower, for which plumes would be larger and more frequent.

HRSG Exhaust Plume

54. Please provide a table that presents any changes to the turbine/HRSG exhaust variables, as shown in AFC Appendix 8.1 Table 8.1-A2-1, that result from the implementation of the proposed turbine/HRSG exhaust plume visibility reduction technology.

Response: See response to Data Request 53, above.

ATTACHMENT VIS-1

Revised Photographic Simulations

KOP-1

Figure DR47-1. KOP-1—Simulation with Phase 2 installed and landscaping at 5 years from planting time.

Figure DR47-2 KOP-1—Simulation with Phase 2 installed and landscaping at 20 years from planting.

ATTACHMENT VIS-2

Landscape Tree Growth Table

Los Esteros Critical Energy Facility

Plant Schedule (Vis-3)

				AT PLANTING				HEIGHT x WIDTH OVER TIME				
TREES	BOTANICAL NAME	COMMON NAME	SIZE	APPROX. AGE, YEARS	HEIGHT	WIDTH	CALIPER	AT 5 YRS	AT 10 YRS	AT 20 YRS	AT MATURITY (under normal conditions)	APPROX. TIME TO MATURITY
CAS CUM**	Casurina Cunninghamiana	River She-Oak	15 Gal	4	7-8'	2-3'	1"	18' x 10'	30' x 15'	50' x 20'	70' x 25'	36 YRS
CAS CUM	Casurina Cunninghamiana	River She-Oak	36" Box	6	14'	4'	3"	20' x 10'	30' x 15'	50' x 20'	70' x 25'	34 YRS
FRA UHD	Fraxinus Uhdei	Shamel Ash	15 Gal	4	7-8'	2-3'	1"	18' x 10'	30' x 20'	40' x 30'	60' x 40'	36 YRS
MEL QUI	Melaleuca Quinquenervia	Cajeput Tree	15 Gal	4	6-7'	2'	1"	12' x 8'	16' x 12'	20' x 15'	30' x 20'	36 YRS
PLA RAC	Platanus Racemosa	California Sycamore	15 Gal	4	7-8'	2-3'	1"	18' x 12'	30' x 20'	45' x 30'	60' x 40'	46 YRS
QUE AGR	Quercus Agrifolia	Coast Live Oak	15 Gal	4	7-8'	2-3'	1"	12' x 10'	20' x 18'	30' x 30'	60' x 60'	56+ YRS
QUE AGR	Quercus Agrifolia	Coast Live Oak	24" Box	5	8-10'	3-4'	1-1/2"	14' x 12'	22' x 20	35' x 35'	60' x 60'	55+ YRS
QUE AGR	Quercus Agrifolia	Coast Live Oak	36" Box	6	12-14'	6-7'	2"	16' x 14'	25' x 22'	40' x 40'	60' x 60'	54+ YRS
QUE AGR	Quercus Agrifolia	Coast Live Oak	48" Box*	8	14'	8'	5"	17' x 15'	28' x 28'	40' x 40'	60' x 60'	52+ YRS
QUE AGR	Quercus Agrifolia	Coast Live Oak	60" Box*	10	16'	10'	6"	19' x 16'	29' x 29'	40' x 40'	60' x 60'	50+ YRS
QUE AGR	Quercus Agrifolia	Coast Live Oak	72" Box*	12	18'	12'	8"	21' x 18'	30' x 30'	40' x 40'	60' x 60'	48+ YRS
QUE AGR	Quercus Agrifolia	Coast Live Oak	84" Box*	14	20'	15'	10"	24' x 20'	31' x 31'	40' x 40'	60' x 60'	46+ YRS

* Some of the Quercus Agrifolia specimen trees may be multi-trunk form; height may be less if width is greater than specified.

**Note: Casurina is unavailable and redwood (Sequois sempervirens) has been substitited. Growth assumptions are as follows:

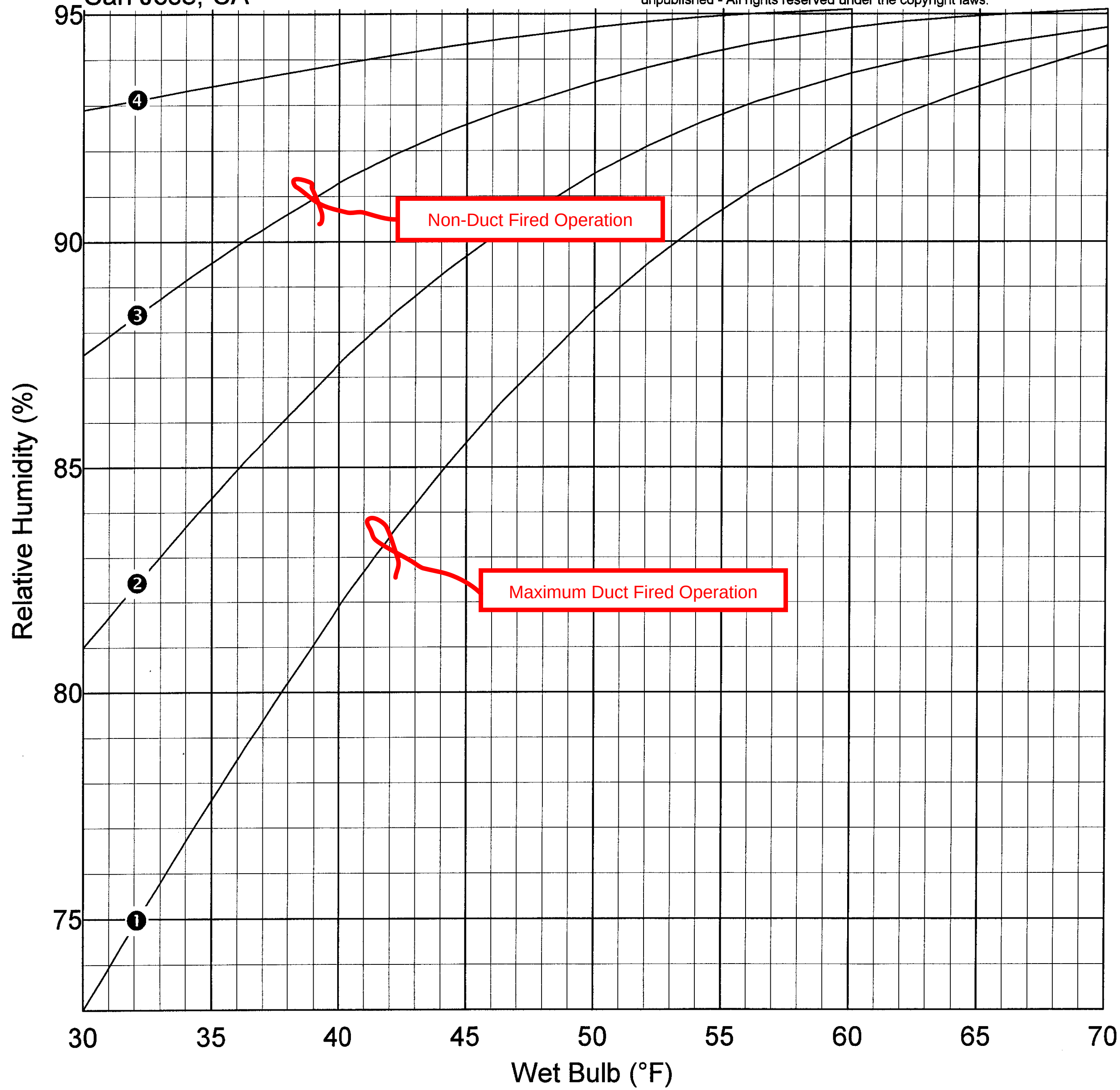
	Sequoia sempervirens	Redwood	24" Box	5	10-12'	3-4'	2"	35' x 10'	55' x 15'	80' x 20'	100+' x 25'	50 YRS

ATTACHMENT VIS-3

Fogging Frequency Curves

Fogging Frequency Curve for
Calpine - Los Esteros (Phase 2)
San Jose, CA

Marley Cooling Technologies
TRACS Version 05.20.03



Model	F488A-6.0-06PPWD
Number of Cells	6
Motor Output	250HP
Motor RPM	1800
Fan	336HP7 - 9
Fan RPM (Full Speed)	134

Design Conditions:

Flow Rate	73000GPM
Hot Water	90.10°F
Cold Water	69.40°F
Wet-Bulb	55.00°F

Curve Conditions:

Fan Pitch	Constant
Dry Dampers Open	100%
Flow Rate (100% Design Flow)	73000GPM

Tangency 95.1%

FOGGING FREQUENCY CURVE: The curve shown to the left is referred to as a 'Fogging Freqency Curve'. The Fogging Freqency Curve separates entering cooling tower conditions that produce fog at the discharge (Top-Left region of chart) from those that do not produce fog (Bottom-Right region of chart)

❹	10 °F Range
❸	13.5 °F Range
❷	17 °F Range
❶	20.7 °F Range
X	Design Point

Comments added by GRB 4/16/04

Time: 07:54:21 Date: 04-16-2004 Drawn By: GPH

Technical Area: Waste Management (55-57)

SMP Map

55. Please locate the following on an appropriately scaled figure of the site:

a. Those onsite locations where earthmoving will be scheduled and where the SMP will potentially apply.

Response: Figure 8.11-S1 from Applicant's March 2004 Data Adequacy Supplement to the AFC provides a General Arrangement drawing of the existing Phase 1 facility and the proposed Phase 2 facility. All areas outlined in yellow (i.e., the Phase 2 facility) are subject to earthmoving activities.

b. All onsite locations that have been remediated.

c. All the Phase II ESA soil and groundwater sampling locations.

Response: Site clearing and remediation for the LECEF Phase 1 project occurred prior to the completion of the CEC licensing process. As noted in the Commission Decision for LECEF dated July 2002, "Because the condition of the site attracted safety nuisances, the City of San Jose's Fire Department requested and received permission for the site to undergo limited demolition and remediation—associated with dilapidated buildings, greenhouses, and associated facilities (Commission Decision, p. 257)." Site clearing and remediation were conducted at the time that CEC Staff was preparing the Staff Assessment for LECEF Phase 1 and the results of the site clearing and remediation were fully addressed in the Staff Assessment.

The Commission Decision summarized soil and groundwater contamination noted in the Phase 2 Environmental Site Assessment (ESA) and further noted that, with respect to asbestos, lead based paint, several pesticides and associated metals in the soil, that "Staff found that Applicant appropriately remediated the site (Commission Decision, p. 258)." With respect to gasoline and two diesel fuel underground storage tanks identified in the Phase 1 and Phase 2 ESA, the Commission Decision notes that "Applicant proposed to remove the tanks before beginning construction activities; Staff concluded that Applicant satisfactorily conducted remedial actions (including tank removal and the preparation of a Tank Closure Inspection Report) (Commission Decision, p. 258)." With regard to several water supply wells and groundwater monitoring at the site the Commission Decision notes:

> Finally, Applicant discovered several water supply wells and a groundwater monitoring well on site. Applicant destroyed these wells in accordance with well destruction guidelines issued by the Santa Clara Valley Water District. All existing structures on the site that may have contained asbestos or lead-based paint have been identified, surveyed, and remediated consistent with appropriate standards (Commission Decision, p. 258) .

For the reasons noted above, Applicant maintains that the environmental issues raised in the Phase I and II ESA were appropriately resolved prior to the licensing and construction of the Phase 1 facility. The Phase I and II ESA addressed the entire 55-acre site upon which the existing LECEF facility sits and included the areas where the proposed LECEF Phase 2 facility will be constructed.

However, in the interest of being responsive to the Staff's Data Request 55, attached at the end of this section (Attachment WM-1) are the relevant sections of the Phase II ESA that describe the areas sampled (including sampling locations), the location of the underground storage tanks, and the sampling results.

Phase II Sampling Results

56. Provide a tabulation of the Phase II ESA soil and groundwater sampling results including sampling location, contaminant types, sampling depths and contaminant concentrations. Sampling locations need to match with information provided in the figure requested above.

Response: See response to Data Request 55, above.

Remediation Type

57. Describe the type of remediation that has been undertaken at the site, e.g., capping, dig and haul, etc and identify their locations on the figure requested above. Elaborate on any regulatory cleanup levels that were employed.

Response: See response to Data Request 55 (a) and (b), above. As noted above, excavation and offsite disposal was undertaken in two areas where such excavation was recommended by the Phase II ESA. Attachment WM-1 contains drawings of the areas where this excavation occurred.

ATTACHMENT WM-1

Phase II Environmental Site Assessment

LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

Phase II Soil and Ground Water Quality Evaluation

55-acre Lin/Hom parcel

San Jose, California

This report has been prepared for:

Calpine

620 Coolidge Drive, Suite 200, Folsom, California 95630

July 14, 2000

Project No. 587-12F

James P. Kiernan
Staff Environmental Engineer

Stason I. Foster, P.E.
Senior Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
STASON I. FOSTER
No. 051495
EXP. 6-30-02
CIVIL
STATE OF CALIFORNIA

405 Clyde Avenue Mountain View, CA 94043-2209 Tel: 650.967.2365 Fax: 650.967.2785
P.O. Box 1388 Mountain View, CA 94042-1388 E-mail: mail@lowney.com

TABLE OF CONTENTS

PHASE II SOIL AND GROUND WATER QUALITY EVALUATION
55-ACRE LIN/HOM PARCEL
SAN JOSE, CALIFORNIA

1.0 INTRODUCTION

1.1 Purpose

In this report, we present the results of the soil and ground water quality evaluation performed at the 55-acre Lin/Hom parcel located in San Jose, California (Figure 1). This work was performed for Calpine who is considering purchasing the property for com-mercial development.

1.2 Site Background

The approximately 55-acre parcel is located near the northwest intersection of Highway 237 and Coyote Creek. The site is located in an agricultural, residential, and commercial area and is bounded by McCarthy Lane to the north; Alviso-Milpitas Road to the south; agricultural, residential, and commercial property to the east; and vacant land to the west (Figure 2). This parcel currently is being used for various agricultural farming purposes.

The site is developed with several nursery/greenhouse complexes and residential structures. As discussed in our Phase I Environmental Site Assessment reports dated February 13, 2000 and April 13, 2000 (draft), underground storage tanks (USTs) (three diesel fuel tanks and one gasoline tank), and several pesticide mixing/storage areas were identified on-site (Figure 2). These areas, coupled with former agricultural use of the property, prompted the performance of this phase of work to evaluate soil and ground water quality.

1.3 Scope of Work

The scope of work performed was outlined in our agreement with you, dated April 26, 2000, and included the following tasks.

- Drilling of exploratory borings near the USTs and pesticide mixing/storage areas, and from the greenhouse/agricultural areas.

- Collection of soil and ground water samples for laboratory analysis.

2.0 SOIL AND GROUND WATER QUALITY EVALUATION

To evaluate soil and ground water quality near the former USTs, the pesticide storage and mixing areas, and within the greenhouses located on the parcel, a subsurface investigation was performed on May 9, 10, 11, and 13, 2000. Under the supervision of Principal Environmental Engineer Stason I. Foster, Environmental Geologist John W. McCain drilled 59 borings to approximate depths between 2½ and 10 feet.

2.1 UST Areas

As shown on Figures 3, 4, and 5, one boring was drilled near each of the existing UST locations. For the diesel UST that reportedly had floated to the ground surface during a flood in approximately 1982, a boring was drilled near the former in-place location to the east of the boiler structure on the Lin property.

Ground water was encountered in three of the four borings at approximate depths of 3 to 4 feet. Soil and ground water sampling protocols are presented in Appendix A.

Soil samples collected from just above the shallow water-bearing zone and ground water grab samples (where encountered) from each boring, were selected for submittal to a state-certified analytical laboratory.

The samples were analyzed for total petroleum hydrocarbons as gasoline and diesel (TPHg and TPHd) (EPA Test Method 8015); benzene, toluene, ethylbenzene, and total xylenes (BTEX) (EPA Test Method 8020); and fuel oxygenates (EPA Test Method 8260). The ground water samples additionally were analyzed for organochlorine pesticides (EPA Test Method 8081). These analyses were selected to help evaluate possible contamination due to the presence of the USTs. The results of these analyses are presented in Tables 1 and 2. Copies of the analytical reports and chain of custody documentation are presented in Appendix A.

Table 1. Analytical Results of Selected Soil Samples – UST Area
(concentrations in parts per million)

Boring Number	Depth (feet)	TPHg	TPHd	BTEX	Fuel Oxygenates
T-1	2½ - 3	<1.0	<1.0	<0.005	<0.005
T-2	2½ - 3	<1.0	<1.0	<0.005	<0.005
T-3	9½ - 10	<1.0	<1.0	<0.005	<0.005
T-4	2½ - 3	<1.0	<1.0	<0.005	<0.005

< Indicates that the compound was not detected at or above the stated laboratory reporting limit

Table 2. Analytical Results of Selected Ground Water Samples-UST Area
(concentrations in parts per million)

Well Number	Date	TPHg	TPHd	BTEX	Fuel Oxygenates	Organochlorine Pesticides
T-1	5/11/00	<50	<50	<0.5	<5	ND
T-2	5/11/00	<50	<50	<0.5	<5	ND
T-4	5/11/00	<50	<50	<0.5	<5	ND

< Indicates that the compound was not detected at or above the stated laboratory reporting limit
ND – Not Detected (detection limits vary)

2.2 Greenhouses and Pesticide Storage/Mixing Areas

2.2.1 Soil Quality

Fifty-five soil samples were collected at a depth of approximately ½ foot from the borings drilled near the greenhouses and the pesticide storage and mixing areas. These samples were analyzed for organochlorine pesticides (EPA Test Method 8081) and the metals mercury, arsenic, selenium, and lead. The pesticide and metals results are presented in Tables 3 and 4, respectively. Sampling locations are shown on Figure 6.

Table 3. Analytical Results of Selected Soil Samples – Organochlorine Pesticides
(concentrations in parts per million)

Boring Number	Depth (feet)	DDT	DDE	DDD	Dieldrin	Heptachlor Epoxide	Endo-sulfan I	Endo-sulfan II	Endrin	Toxaphene
S-1	0 - ½	0.328	1.52	<0.100	<0.100	<0.050	<0.050	<0.100	<0.100	<4.25
S-2	0 - ½	0.328	1.54	<0.100	<0.100	<0.050	<0.050	<0.100	<0.100	<4.25
S-3	0 - ½	0.363	1.83	<0.200	<0.200	<0.100	<0.100	<0.200	<0.200	<8.50
S-4	0 - ½	0.181	1.55	<0.100	<0.100	<0.050	<0.050	<0.100	<0.100	<4.25
S-5	0 - ½	0.049	0.236	<0.020	<0.020	<0.010	<0.010	<0.020	<0.020	<0.850
S-6	0 - ½	0.483	1.80	<0.200	<0.200	<0.100	<0.100	<0.200	<0.200	<8.50
S-7	0 - ½	0.142	1.10	<0.080	<0.080	<0.040	<0.040	<0.080	<0.080	<3.40
S-9	0 - ½	0.127	0.699	<0.080	<0.080	<0.040	<0.040	<0.080	<0.080	<3.40
S-10	0 - ½	0.083	0.806	<0.080	<0.080	<0.040	<0.040	<0.080	<0.080	<3.40
S-11	0 - ½	0.047	0.551	<0.040	<0.040	<0.020	<0.020	<0.040	<0.040	<1.70
S-12	0 - ½	0.121	0.865	<0.080	<0.080	<0.040	<0.040	<0.080	<0.080	<3.40
S-13	0 - ½	0.251	1.07	<0.100	<0.100	<0.050	<0.050	<0.100	<0.100	<4.25
S-14	0 - ½	0.207	1.27	<0.080	<0.080	<0.040	<0.040	<0.080	<0.080	<3.40
S-15	0 - ½	<0.2	0.379	<0.200	<0.200	<0.100	<0.100	<0.200	<0.200	<8.50
S-16	0 - ½	0.088	0.740	<0.040	<0.040	<0.020	<0.020	<0.040	<0.040	<1.70
S-17	0 - ½	0.083	0.347	<0.040	<0.040	<0.020	<0.020	<0.040	<0.040	<1.70
S-18	0 - ½	0.344	1.20	<0.080	<0.080	<0.040	<0.040	<0.080	<0.080	<3.40
S-19	0 - ½	0.163	0.914	<0.100	<0.100	<0.050	<0.050	<0.100	<0.100	<4.25

continued

Table 3. Analytical Results of Selected Soil Samples – Organochlorine Pesticides
(concentrations in parts per million)
(continued)

Boring Number	Depth (feet)	DDT	DDE	DDD	Dieldrin	Heptachlor Epoxide	Endo-sulfan I	Endo-sulfan II	Endrin	Toxaphene
S-20	0 - ½	<0.04	0.481	<0.04	<0.04	<0.02	<0.02	<0.04	<0.04	<1.7
S-21	0 - ½	0.066	<0.04	<0.04	<0.04	0.498	<0.02	<0.04	<0.04	<1.7
S-22	0 - ½	0.115	0.635	<0.04	<0.04	<0.02	<0.02	<0.04	<0.04	<1.7
S-23	0 - ½	0.305	3.09	<0.2	<0.2	<0.1	<0.1	<0.2	<0.2	<8.5
S-24	0 - ½	8.66	1.1	1.27	<0.4	0.389	1.75	<0.4	<0.4	<17
S-25	0 - ½	<0.1	1.01	<0.1	<0.1	<0.05	<0.05	<0.1	<0.1	<4.25
S-26	0 - ½	<0.2	1.73	<0.2	<0.2	<0.1	<0.1	<0.2	<0.2	<8.5
S-27	0 - ½	<0.16	0.949	<0.16	<0.16	<0.04	<0.04	<0.16	<0.16	<3.4
S-28	0 - ½	0.323	1.62	<0.08	<0.08	<0.04	<0.04	<0.08	<0.08	<3.4
S-29	0 - ½	0.023	0.141	0.0094	<0.008	<0.004	<0.004	<0.008	<0.008	<0.34
S-30	0 - ½	0.092	1.02	0.064	<0.08	<0.04	<0.04	<0.08	<0.08	<3.4
S-31	0 - ½	1.78	<0.2	<0.2	<0.2	<0.1	<0.1	<0.2	<0.2	<8.5
S-32	0 - ½	0.045	0.398	<0.04	<0.04	<0.02	<0.02	<0.04	<0.04	<1.7
S-33	0 - ½	0.117	0.454	<0.04	<0.04	<0.02	<0.02	<0.04	<0.04	<1.7
S-34	0 - ½	0.092	0.74	0.044	<0.04	<0.02	<0.02	<0.04	<0.04	<1.7
S-35	0 - ½	0.084	0.644	<0.04	<0.04	<0.02	<0.02	<0.04	<0.04	<1.7
S-36	0 - ½	<0.04	0.642	<0.04	<0.04	<0.02	<0.02	<0.04	<0.04	<1.7
S-37	0 - ½	0.134	0.476	0.049	<0.04	<0.02	<0.02	<0.04	<0.04	<1.7
S-38	0 - ½	0.067	0.304	0.035	<0.004	<0.002	<0.002	<0.004	<0.004	<0.17
S-39	0 - ½	0.0049	0.018	0.013	<0.004	<0.002	<0.002	<0.004	<0.004	<0.17
S-40	0 - ½	0.11	1.63	0.052	<0.04	<0.02	<0.02	<0.04	<0.04	<1.7
S-41	0 - ½	0.393	1.87	0.038	0.019	<0.002	<0.002	<0.004	<0.004	<0.17
S-42	0 - ½	0.175	1.73	0.076	<0.04	<0.02	<0.02	<0.04	<0.04	<1.7
S-43	0 - ½	0.137	1.384	0.039	0.0083	<0.002	<0.002	<0.004	<0.004	<0.17
S-44	0 - ½	0.035	0.205	0.02	<0.004	<0.002	<0.002	<0.004	<0.004	<0.17
S-45	0 - ½	0.308	1.05	0.036	<0.004	<0.002	<0.002	<0.004	<0.004	<0.17
S-46	0 - ½	0.085	0.39	0.0097	<0.004	<0.002	<0.002	<0.004	<0.004	<0.17
S-47	0 - ½	0.013	0.106	<0.008	<0.008	<0.004	<0.004	<0.008	<0.008	<0.34
S-48	0 - ½	<0.5	1.10	<0.1	<0.1	<0.1	<0.5	<0.5	<0.1	<5.0
S-50	0 - ½	0.504	1.45	0.138	<0.1	<0.05	<0.05	<0.1	<0.1	<4.2
S-51	0 - ½	0.271	1.02	0.03	0.017	<0.002	<0.002	<0.004	<0.004	<0.17
S-52*	0 - ½	0.098	0.023	0.014	<0.004	<0.002	<0.002	<0.004	<0.004	12.0
S-53	0 - ½	0.504	1.27	0.085	0.011	<0.002	<0.002	<0.004	<0.004	<0.17
S-54	0 - ½	<0.004	1.51	<0.004	0.01	<0.002	<0.002	0.128	0.062	<0.17
S-55	0 - ½	0.224	1.85	0.056	0.014	<0.002	<0.002	<0.004	<0.004	<0.17
S-56	0 - ½	0.026	0.427	0.035	<0.004	<0.002	<0.002	<0.004	<0.004	<0.17
S-57	0 - ½	0.23	1.99	0.083	0.016	<0.002	<0.002	<0.004	<0.004	<0.17
T-3	9½ -10	<0.004	<0.004	<0.004	<0.004	<0.002	<0.002	<0.004	<0.004	<0.17
T-4	2½ - 3	<0.004	<0.004	<0.004	<0.004	<0.002	<0.002	<0.004	<0.004	<0.17
PRG	--	12.0	12.0	17.0	0.15	0.27	5,300	5,300	260	2.20
TTLC	--	1.0	1.0	1.0	8.0	4.7	NE	NE	0.200	5.0

< Indicates that the compound was not detected at or above the stated laboratory reporting limit
PRG Preliminary Remediation Goal for industrial site use–EPA Region 9, 1999
TTLC Total Threshold Limit Concentration
NE Not Established
* Soil Sample S-52 also contained Alpha-BHC (0.13 ppm), Beta-BHC (0.23 ppm), and Delta-BHC (1.40 ppm)

Table 4. Analytical Results of Selected Soil Samples – Metals
(concentrations in parts per million)

Boring Number	Depth (feet)	Arsenic	Lead	Mercury	Selenium
S-1	0 - ½	32	85	<0.05	<25
S-2	0 - ½	35	87	0.06	<25
S-3	0 - ½	28	85	0.06	<25
S-4	0 - ½	57	140	0.08	<25
S-5	0 - ½	39	110	0.06	<25
S-6	0 - ½	48	140	0.06	<25
S-7	0 - ½	36	110	<0.05	<25
S-9	0 - ½	37	91	0.07	<25
S-10	0 - ½	42	110	0.07	<25
S-11	0 - ½	57	150	0.06	<25
S-12	0 - ½	55	160	<0.05	<25
S-13	0 - ½	42	120	0.1	<25
S-14	0 - ½	56	140	0.11	<25
S-15	0 - ½	19	41	0.07	<25
S-16	0 - ½	58	150	0.08	<25
S-17	0 - ½	50	120	<0.05	<25
S-18	0 - ½	34	79	0.08	<25
S-19	0 - ½	35	89	<0.05	<25
S-20	0 - ½	48	120	0.12	<25
S-21	0 - ½	36	85	0.05	<25
S-22	0 - ½	34	85	0.05	<25
S-23	0 - ½	59	150	0.11	<25
S-24	0 - ½	32	90	<0.05	<25
S-25	0 - ½	50	120	0.13	<25
S-26	0 - ½	49	110	0.12	<25
S-27	0 - ½	51	130	0.13	<25
S-28	0 - ½	49	140	0.1	<25
S-29	0 - ½	51	130	<0.05	<25
S-30	0 - ½	55	120	0.08	<25
S-31	0 - ½	34	88	0.05	<25
S-32	0 - ½	36	76	0.06	<25
S-33	0 - ½	42	130	<0.05	<25
S-34	0 - ½	48	140	0.1	<25
S-35	0 - ½	51	130	0.06	<25
S-36	0 - ½	47	140	<0.05	<25
S-37	0 - ½	56	160	0.07	<25
S-38	0 - ½	42	100	0.05	<25
S-39	0 - ½	28	64	0.07	<25
S-40	0 - ½	43	160	0.12	<25
S-41	0 - ½	46	140	<0.05	<25
S-42	0 - ½	52	170	0.09	<25
S-43	0 - ½	55	180	0.11	<25
S-44	0 - ½	43	130	<0.05	<25

continued

Table 4. Analytical Results of Selected Soil Samples – Metals
(concentrations in parts per million)
(continued)

Boring Number	Depth (feet)	Arsenic	Lead	Mercury	Selenium
S-45	0 - ½	55	180	0.06	<25
S-46	0 - ½	65	170	0.07	<25
S-47	0 - ½	11	<5.0	<0.05	<25
S-48	0 - ½	50	130	<0.05	<25
S-50	0 - ½	53	180	0.09	<25
S-51	0 - ½	46	120	0.06	<25
S-52	0 - ½	67	310	0.6	<25
S-53	0 - ½	45	140	<0.05	<25
S-54	0 - ½	58	140	0.06	<25
S-55	0 - ½	39	94	<0.05	<25
S-56	0 - ½	51	130	0.54	<25
S-57	0 - ½	42	94	<0.05	<25
PRG	--	2.7	1,000	610	10,000
TTLC	--	500	1,000	20	100

< Indicates that the compound was not detected at or above the stated laboratory reporting limit
TTLC Total Threshold Limit Concentration
PRG Preliminary Remediation Goal for industrial site use–EPA Region 9, 1999

In addition, 19 of the shallow soil samples were analyzed for organophosphorous pesticides (EPA Test Method 8141), N-methyl carbamates (EPA Test Method 8318) and chlorinated herbicides (EPA Test Method 8151). The results of these analyses are shown in Table 5. The only two organophosphorous pesticides detected in the samples were chlorpyrifos and parathion. The only chlorinated herbicide detected in the samples was pentachlorophenol. No N-methyl carbamates were detected in any of the samples and therefore not shown in Table 5.

Table 5. Analytical Results of Selected Soil Samples - Organophosphorous Pesticides and Chlorinated Herbicides
(concentrations in parts per million)

Boring Number	Depth (feet)	Chlorpyrifos (Dursban)	Parathion	Pentachlorophenol (PCP)
S-1	0 - ½	<0.03	<0.04	<0.01
S-2	0 - ½	<0.03	<0.04	<0.01
S-4	0 - ½	<0.03	<0.04	<0.01
S-5	0 - ½	<0.03	<0.04	<0.01
S-6	0 - ½	<0.03	<0.04	<0.01
S-10	0 - ½	<0.03	<0.04	<0.01
S-11	0 - ½	<0.03	<0.04	<0.01

continued

Table 5. Analytical Results of Selected Soil Samples - Organophosphorous Pesticides and Chlorinated Herbicides
(concentrations in parts per million)
(continued)

Boring Number	Depth (feet)	Chlorpyrifos (Dursban)	Parathion	Pentachlorophenol (PCP)
S-13	0 - ½	<0.03	<0.04	<0.01
S-14	0 - ½	<0.03	<0.04	<0.01
S-20	0 - ½	<0.03	<0.04	<0.01
S-21	0 - ½	<0.03	<0.04	<0.01
S-23	0 - ½	<0.03	<0.04	<0.01
S-24	0 - ½	0.100	0.06	0.42
S-25	0 - ½	<0.03	<0.04	<0.01
S-29	0 - ½	<0.03	<0.04	<0.01
S-30	0 - ½	<0.03	<0.04	<0.01
S-39	0 - ½	<0.03	<0.04	<0.01
S-47	0 - ½	<0.03	0.06	<0.01
S-51	0 - ½	<0.03	<0.04	<0.01
PRG	--	2,600	5,300	11.0

< Indicates that the compound was not detected at or above the stated laboratory reporting limit
PRG Preliminary Remediation Goal for industrial site use–EPA Region 9, 1999

2.2.2 Ground Water Quality

To evaluate ground water quality, ground water grab samples were collected from six borings drilled near the pesticide storage and mixing areas (S-24, S-29, S-47, S-50, S-51, and S-53) (Figure 6). The ground water samples were analyzed for organochlorine pesticides and the metals mercury, arsenic, selenium, and lead. The results of the metals analysis are presented in Table 6.

Table 6. Analytical Results of Selected Ground Water Samples- Pesticide Storage and Mixing Areas
(concentrations in parts per billion)

Boring Number	Date	Arsenic	Lead	Mercury	Selenium	Organochlorine Pesticides
S-24	5/10/00	<5.0	<15	<0.2	<15	ND*
S-29	5/11/00	<5.0	30	<0.2	<15	ND
S-47	5/11/00	<5.0	<15	<0.2	<15	ND
S-50	5/11/00	<5.0	<15	<0.2	<15	ND
S-51	5/13/00	14	26	<0.2	<15	ND
S-53	5/13/00	<5.0	30	<0.2	<15	ND
MCL	--	50	15**	2.0	50	

< Indicates that the compound was not detected at or above the stated laboratory reporting limit
MCL Drinking water Maximum Contaminant Levels–California DHS, March 12, 1999
ND Not Detected (detection limits vary)
* All non-detect except for Endosulfan I at 0.3 ppb.
** Lead Action Level for drinking water

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 Soil Quality – Pesticides and Metals

The laboratory analyses of soil samples detected various pesticides. The main pesticide detected was DDT and the related compounds DDD and DDE. The sum of these three compounds is commonly referred to as total DDT. Total DDT levels up to 11.03 ppm were detected in one sample; however, in most samples, the total DDT levels ranged from about 0.5 to 2.5 ppm. In about half the samples, the total DDT concentrations were greater than the 1.0 ppm Total Threshold Limit Concentration (TTLC). The TTLC is the level above which a solid waste is considered hazardous per Title 22 of the California Code of Regulations.

None of the total DDT levels detected exceed the preliminary remediation goal (PRG) of 12.0 ppm for industrial site use. The PRGs are risk-based concentrations developed by EPA Region 9 for use as screening levels in determining if further evaluation is warranted, in prioritizing areas of concern, in establishing initial cleanup goals, and in estimation of potential health risks. The PRGs are chemical concentrations that correspond to fixed levels of risk (either a cancer risk of one in one million [10^{-6}] or a non-carcinogenic hazard quotient of one, whichever occurs at a lower concentration).

Since the DDT levels detected do not exceed the PRGs, the concentrations detected do not appear to pose a significant threat to human health in a commercial or industrial setting. If property use were to be changed to a residential setting, additional work likely would be required. Since the site is planned for commercial use and will be largely capped by buildings and associated concrete drives and parking areas, risk to human health and the environment will be significantly reduced.

Heptachlor epoxide was detected in two of the samples at 0.498 and 0.389 ppm. Although above the PRG (0.27 ppm), this compound does not appear to be a significant concern since it was only infrequently detected; thus, significant exposure is unlikely to occur. The levels detected also are well below the TTLC of 4.7 ppm.

Toxaphene was detected in only one sample (S-52). However, the concentration detected (12.0 ppm) is well above the PRG (2.2 ppm) and TTLC (5.0 ppm). Since this sample was collected from a pesticide storage/mixing area and exceeds both the PRG and TTLC, we recommend that additional sampling be performed in this vicinity to evaluate the vertical and horizontal extent of toxaphene-impacted soil.

Lead and arsenic concentrations detected in soil are higher than typical background levels which are commonly less than 50 ppm and less than 10 ppm, respectively. However, the levels detected are well below their respective TTLC values of 1,000 and 500 ppm. As with the residual pesticides, the metal concentrations detected do not appear to pose a significant threat to human health in a commercial/industrial setting.

Due to the presence of residual pesticides and elevated levels of metals, a construction worker health and safety plan should be developed for the earthwork portion of the proposed development.

We also recommend that further testing for arsenic, lead, and organochlorine pesticides be completed on selected deeper soil samples. This additional testing will help confirm that concentrations of target constituents do not increase with depth. Based on our experience, a reduction in concentrations would be expected in the upper few feet of soil.

If on-site soil is to be off-hauled, additional characterization should be performed prior to transport. Total DDT concentrations in the upper ½ foot of soil appear to exceed California's hazardous waste criteria (TTLC of 1.0 ppm). Since off-site disposal of this soil could be costly, we recommend that the planned development be designed to minimize the amount of soil to be exported.

Only two organophosphorous pesticides (chlorpyrifos and parathion) were detected in the soil samples collected. The only chlorinated herbicide detected was pentachlorophenol. The concentrations detected for each of these compounds were well below their respective PRGs for industrial site use. No N-methyl carbamates were detected in any of the soil samples.

3.2 Soil Quality – Petroleum Hydrocarbons

Petroleum hydrocarbons were not detected in the soil samples collected near the existing USTs. We recommend that the USTs be removed in accordance with applicable regulations prior to site development. Although additional soil and ground water sampling will be required as part of the UST removal process, the data collected to date does not indicate that the USTs have significantly impacted the site.

3.3 Ground Water Quality

During this investigation, ground water grab samples were collected from nine borings advanced near the USTs and pesticide storage/mixing areas at the site. No significant levels of petroleum hydrocarbons or pesticides were detected in the ground water samples analyzed.

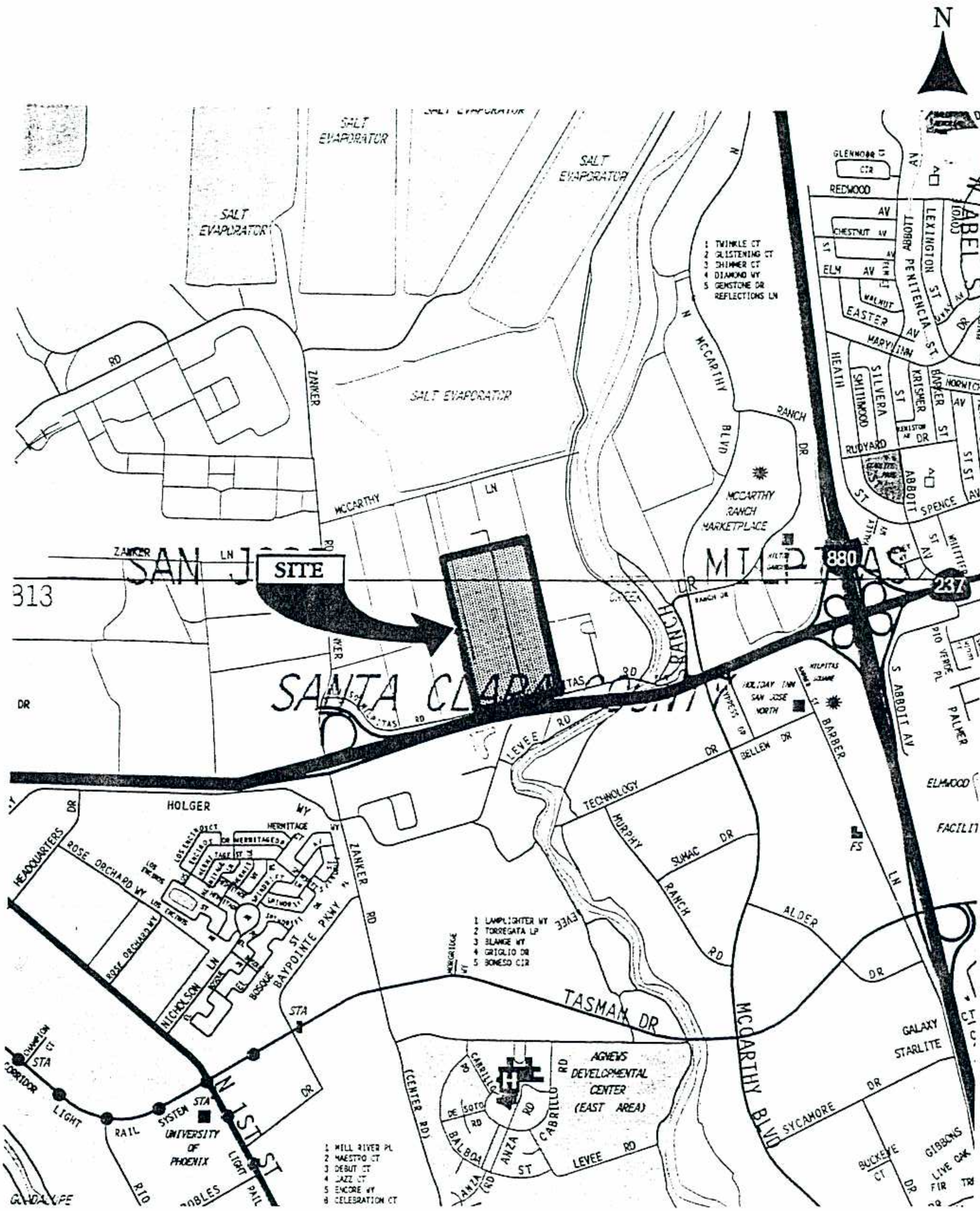
Metal concentrations detected in the ground water samples did not exceed the drinking water maximum contaminant levels (MCLs). Although no MCL has been established for lead, there is an action level of 15 ppb for drinking water at the consumer tap. Lead levels were found to exceed this level in three samples. Since shallow on-site ground water is not proposed as a drinking water source, the lead levels detected do not appear to be a significant concern and may be due to sediments contained in the ground water grab samples.

4.0 LIMITATIONS

This report was prepared for the use of Calpine in evaluating soil and ground water quality at the 55-acre Lin/Hom parcel at the time of this study. We make no warranty, expressed or implied, except that our services have been performed in accordance with environmental principles generally accepted at this time and location. The chemical and other data presented in this report can change over time and are applicable only to the time this study was performed. We are not responsible for the data presented by others.

The accuracy and reliability of geo- or hydrochemical studies are a reflection of the number and type of samples taken and extent of the analyses conducted, and are thus inherently limited and dependent upon the resources expended. Chemical analyses were performed for specific parameters during this investigation, as detailed in the scope of services. Please note that additional constituents not analyzed for during this evaluation may be present in soil and ground water at the site. Our sampling and analytical plan was designed using accepted environmental principles and our judgment for the performance of a soil and ground water quality evaluation and was based on the degree of investigation approved by you. It is possible to obtain a greater degree of certainty, if desired, by implementing a more rigorous soil and ground water sampling program or evaluating the risk posed by the contaminants detected, if any.

* * * * * * * * * * * * * *



7/00*EB

VICINITY MAP

55-ACRE LIN/HOM PROPERTY

San Jose, California

LOWNEY ASSOCIATES

Environmental/Geotechnical/Engineering Services

FIGURE 1

587-12F

Base by Unknown.

SITE PLAN

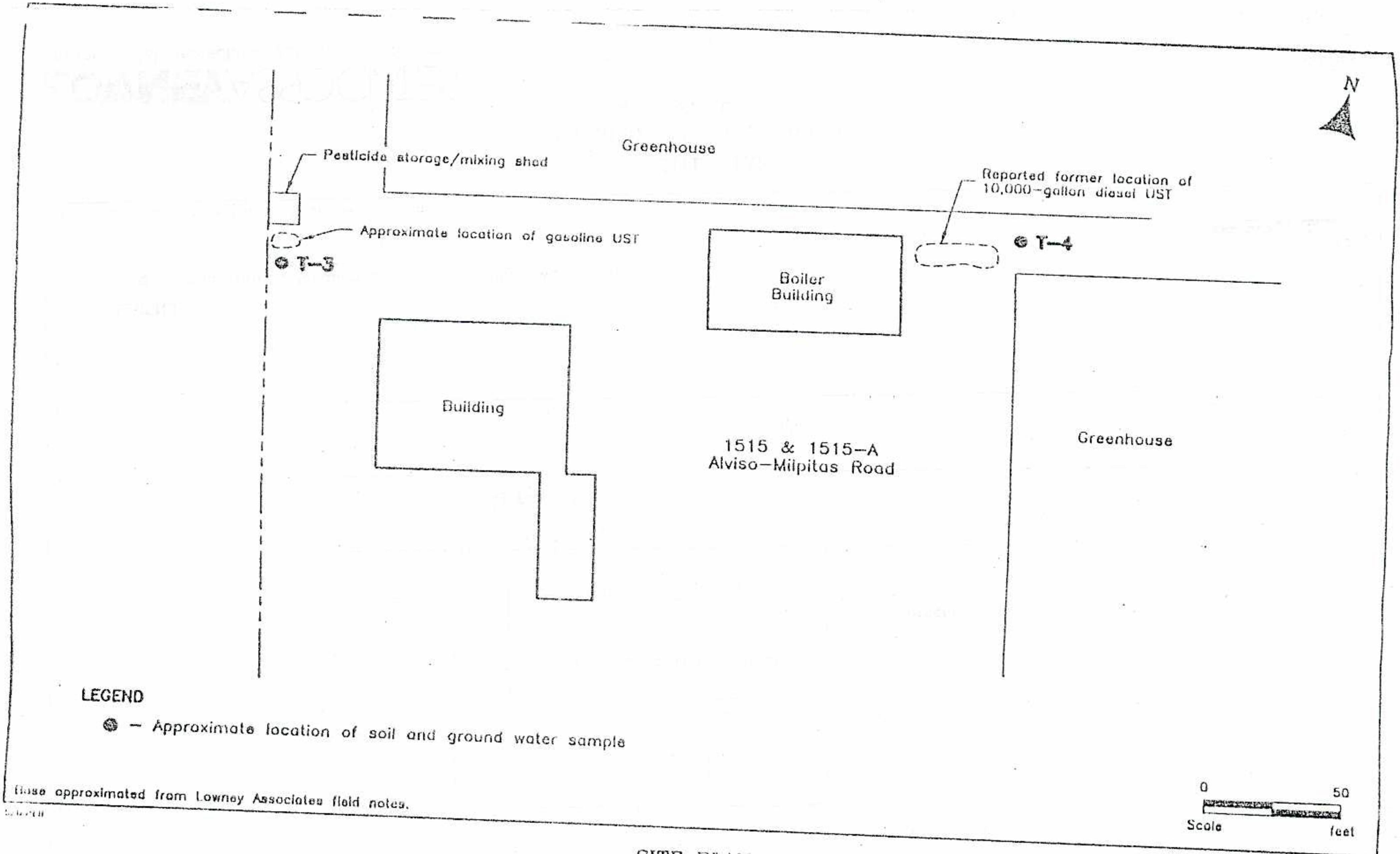
HIGHWAY 237/COYOTE CREEK 55–ACRE PARCEL
San Jose, California

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

FIGURE 2

587–12D

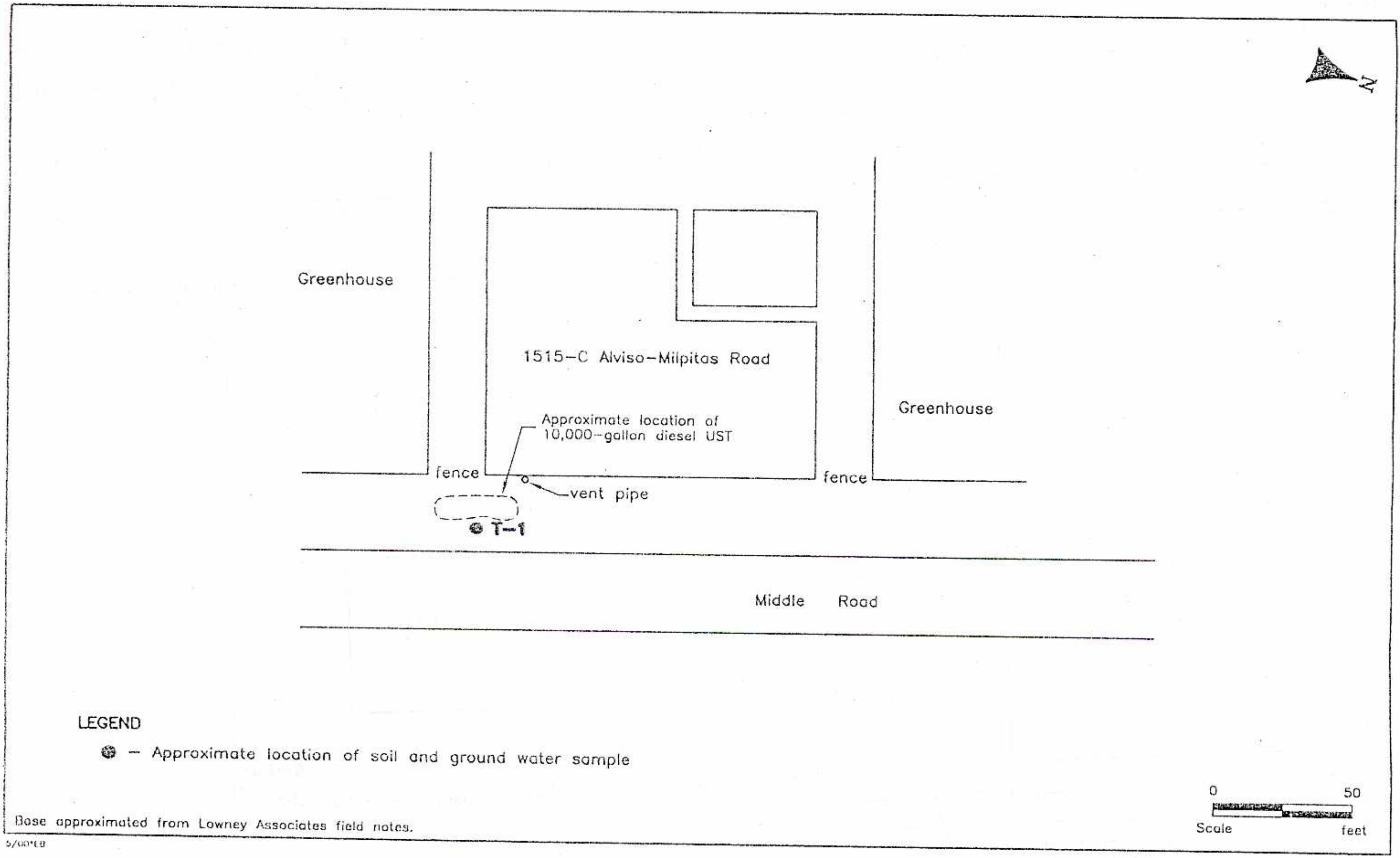
2/00•EB



SITE PLAN
55-ACRE LIN/HOM PROPERTY
San Jose, California

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

FIGURE 3
587-12F



SITE PLAN

55-ACRE LIN/HOM PROPERTY

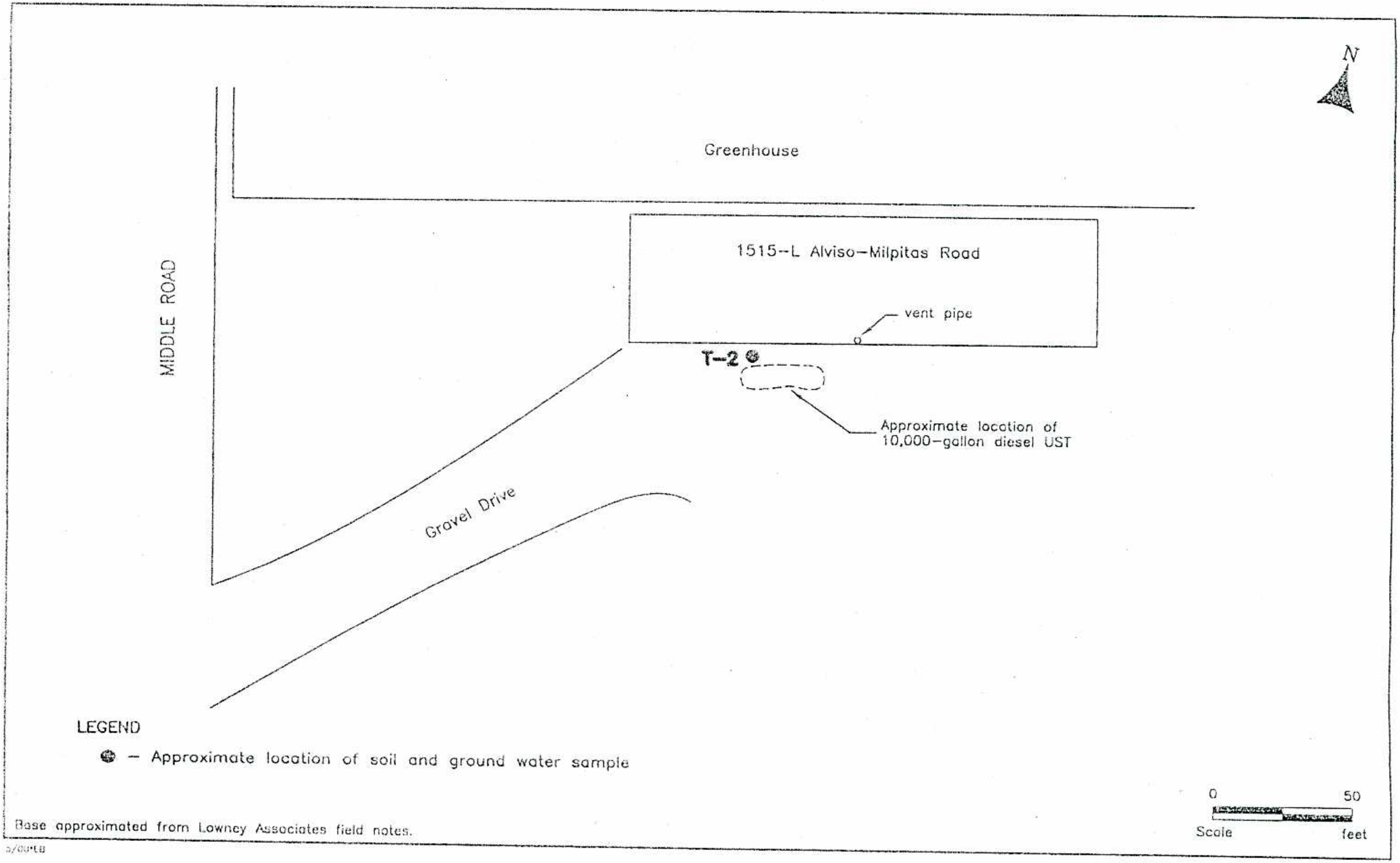
San Jose, California

LOWNEY ASSOCIATES

Environmental/Geotechnical/Engineering Services

FIGURE 4

587-12F

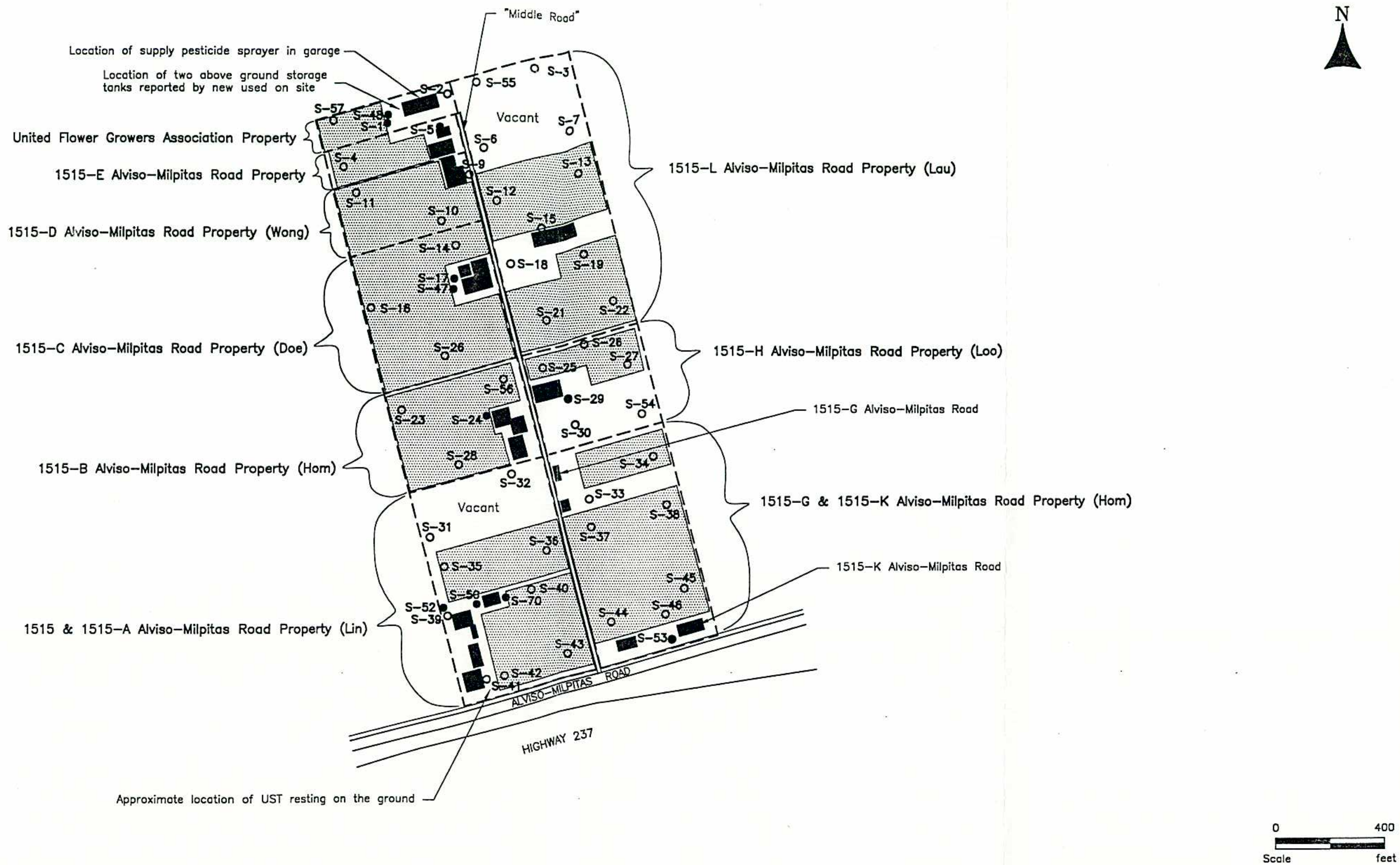


SITE PLAN

55-ACRE LIN/HOM PROPERTY
San Jose, California

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

FIGURE 5
587-12F



LEGEND

- ○ – Approximate location of greenhouse area/former agricultural area soil sample
- ● – Approximate location of pesticide mixing/storage area soil sample and ground water sample (if applicable)
- ▒ – Approximate location of on-site greenhouse/nursery
- ■ – Approximate location of on-site structures

Base by Unknown.

SITE PLAN

55-ACRE LIN/HOM PROPERTY

San Jose, California

LOWNEYASSOCIATES

Environmental/Geotechnical/Engineering Services

FIGURE 6

587-12F

4/00*EB

APPENDIX A

SAMPLING PROTOCOL AND ANALYTICAL RESULTS

Soil Borings: Fifty-nine soil borings were drilled to depths of approximately 2½ to 10 feet. The borings were drilled using a Geoprobe (macro-core), a hand auger and slide hammer, or a macro-core hand sampler.

Soil Sampling: Soil samples for laboratory analysis were collected in acetate or brass liners. The ends of the liners were covered in aluminum foil or Teflon film, fitted with plastic end caps, taped, and labeled with a unique identification number. The samples were then placed in an ice-chilled cooler, and transported to a state-certified analytical laboratory with chain of custody documentation.

Ground Water Sampling: Borings S-29, S-47, and S-50 were converted into "temporary" wells with the installation of 1-inch I.D. flush-threaded, Schedule 40 PVC casing. The casing in the lower portion of the well had 0.02-inch factory machined slots. Ground water grab samples were collected from the temporary wells with a Teflon bailer. Samples were collected in appropriate sampled bottles, labeled, and immediately placed into an ice-chilled chest for delivery to a state-certified analytical laboratory for analysis.

A Teflon bailer was used to collect the samples from borings S-24, S-51, and S-53 that were completed to ground water depth. Samples were collected in appropriate sample bottles, labeled, and immediately placed into an ice-chilled chest for delivery to a state-certified analytical laboratory for analysis.

Equipment Decontamination: All drilling and sampling equipment was cleaned in a solution of laboratory grade detergent and distilled water or steam cleaned before use at each sampling point.

Analytical Results: The chilled samples were delivered to a state-certified analytical laboratory. Chain of custody documentation was maintained for all samples. Attached are copies of the analytical results and the chain of custody forms.